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NOTICES—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Benn Brothers Jubilee History

THE Jubilee History (1880-1930) of the firm of Benn Brothers, Ltd., compiled by Mr. John Benn and published in this issue, is a stirring record of a great enterprise which those engaged in its foundation and expansion may contemplate with justifiable pride, and which has exerted over a period of fifty years a potent influence in the stimulation of many British industries. The achievement was suitably crowned by King George's jubilee message to Sir Ernest Benn, the present chairman of the company, expressing the hope that "every success may attend the efforts of your publishing house for the development of British trade."

A feature of Benn Brothers, Ltd., is that, although for some years now a limited company, it remains essentially a family business, with all the personal qualities and personal intimacies implied in that term, but happily with none of its weaknesses. The business was founded, as Mr. John Benn's interesting sketch shows, by four very remarkable brothers, of whom Sir John Benn was the recognised leader, and of whom one still survives. In the second generation the business has grown, under the inspiration and business acumen of Sir Ernest Benn—rightly described once

by Sir Robert Welford, President of the Law Society, as "the mainspring" of the organisation—to the dimensions of an international publishing house. Already the third generation is promisingly represented in its administration, and the growth of its resources continue to equal the growth of its responsibilities, rapid as those have been and are likely to be in the future.

Mr. Walter Runciman, in a recent tribute to the firm, touched the secret of this sustained success in his reference to the chairman's great quality of "merciless insistence on efficiency." If we add to efficiency the idea of service and the habits of individual initiative, industry, confidence and personal interest through the whole fabric of the business, the success achieved, large as it is, is seen to be the natural outcome of what has been and is being put into the enterprise.

There should be some encouragement in all this for the many industries that the firm's journals serve. The times, as so many pessimistically minded keep telling us, are full of difficulties, but if Benn Brothers jubilee has any message for industry to-day, it is that difficulties exist, not to be weakly contemplated, but to be courageously overcome. Those who read the story published in this issue will have missed its central point if that story does not leave them quickened in purpose to achieve a similar success by similar methods in their various ways of life.

The Future of the Dyestuffs Act

THE main point in the answers that the President of the Board of Trade gave to questions in the House this week on the operation of the Dyestuffs Act is that, so far, the Government has come to no definite conclusion as to the future of the Act which, unless renewed, expires in the ordinary way at the end of this year. In the case of the Safeguarding Duties Mr. Snowden has announced the policy of not renewing them. It is clear from Mr. Graham's answers that that announcement does not include the Dyestuffs Act, though, on the other hand, there is no promise or hint of its renewal. The Government would seem to have an open mind—"the subject," in Mr. Graham's words, "remains to be considered in all its aspects before a decision is made." This may be described as the strictly correct attitude pending the receipt of the report on the working of the Act that the Dyestuffs Development Committee are now preparing.

Meanwhile it may be permissible to point out that some of the questions in the House exhibit a notable lack of inside knowledge of the subject. Sir Henry Croft, for example, refers to "the great increase in the price of British dyes." It would be well to know what standard he is applying to the present prices, and what figures he has to show in support of his

suggestion that dyestuffs prices generally are advancing. For the price factor, instead of rising, has steadily fallen for some time, and reductions in prices have several times been announced. Nor is there much sense in his suggestion that "the enormous increase of unemployment in this industry" is attributable to the Dyestuffs Act. What he seems to be referring to is not the dyestuffs manufacturing industry, but the dyeing industry. And any slackness in the latter is easily explained. When the textile mills of Lancashire and Yorkshire are not producing their normal volume of cotton and woollen goods, there is a corresponding reduction in the quantity of fabrics to be dyed. It does not need much imagination to see that this means less work for dyers. Similarly, when the dyers have fewer miles of cotton and woollen pieces to dye, they require proportionately less dyestuffs from the dyestuffs manufacturer, and this, again, reacts naturally on the dyestuffs production branch. The root difficulty is the depression in the textile industry, the chief consumer of dyes, and to suggest that the discontinuance of the Dyestuffs Act will restore prosperity to the textile trade is simply fantastic.

According to Mr. Graham, the number of import licences granted for the three years 1927-28-29 were 6,753, 7,051, and 7,373 respectively. This, instead of showing, as Major McKenzie Wood suggested, "the great handicap of the Act," shows that the handicap, in any case, is declining. The licences to import foreign dyestuffs are increasing, not diminishing. This is exactly what one would expect from the reduction by stages of the standard price factor from three times the pre-war price to the present figure of 1·75. In practice, this means that an import licence may now be granted for a foreign dye, if the British dye price exceeds 75 per cent. on the price of the pre-war foreign equivalent. In other words, the British maker has a preference in price to the extent of 75 per cent. over the pre-war price. When one considers the substantial advantages that have resulted in the course of a single decade—a guaranteed supply of home dyestuffs, the lack of which was acutely felt when war broke out and German supplies were suddenly stopped, the number of people employed in dye-stuff manufacture, and especially the maintenance of a large school of organic chemists and technologists who otherwise would have no vocation—the cost of all these gains to the country and the industry cannot be deemed extortionate.

Sea Coal and Soot

"I LIKE a sea coal fire when not too dear." Most of us agree with Byron's sentiments; as a consequence over 40 million tons per annum of coal are burnt in domestic fireplaces, heedless of the fact that in the City of London the sootfall amounts to 600 tons per square mile of surface per year.

Apparently it has been ever so, for we read that in 1305 great quantities of sea coal were used by the brewers and smiths of the metropolis and numerous complaints were made of the injurious effects of the smoke. In the following year a Royal Proclamation prohibited the use of coal in London, as it was supposed the smoke had a tendency to pollute the air. Evidently

the prejudice did not continue long, for a few years later sea-borne coal from the Tyne was the common fuel of London. And so we suppose it continued until one day in 1661, we are told, as Evelyn was walking at Whitehall "a presumptuous smoke issuing from one or two tunnels near Northumberland House did so invade the Court and fill and infest all the rooms and galleries to such a degree that men could hardly discern one another for the cloud." The trouble and hazard to the health of His Sacred Majesty kindled the indignation of Evelyn and caused him to write his "Fumifugium or the Inconvenience of the Smoake of London dissipated," which has recently become widely available as No. 8 of the Old Ashmolean Reprints.

This time it is the brewers, dyers, soap boilers, and lime burners, and later the glass houses, foundries and sugar bakers, which intermix their noisome works amongst the dwelling houses in the city and suburbs. Evelyn's remedies against the abuse are those we are temporising with to-day. It being impracticable to turn all the noxious trades at once out of the town, though he would have liked to put them all on the Thames marshes below Greenwich, it is proposed to carry the chimneys much higher into the air, so as "in a great measure to disperse the smoke into distant parts without its falling on the houses below." Workmen should be encouraged to make experiments in regard to particular construction of the chimneys, and—a most interesting suggestion—"a method of charring sea coal so as to divest it of its smoke and yet leave it serviceable for many purposes, should be made the object of a very strict inquiry and premiums should be given to those that were successful in it." To-day, two hundred and seventy years later, we are still waiting for this method, or at least its official encouragement, and but for the wide, though still inadequate, use of gas and electricity, our London would often resemble, in Evelyn's analogy, the Picture of Troy sacked by the Greeks.

Another expedient was that sweet-smelling trees and plants should be planted in all open spaces and along the roadways to purify the air. This project is set out in detail in the third section of his pamphlet, and, as is well known, much success was achieved by Evelyn in his efforts to promote arboriculture. The visible world was very close to Evelyn, he used his eyes all the time to look at things, buildings and gardens, streets and trees. Small wonder that he went into the question of smoke and its abatement. To-day the visible world has receded far from us, we live in an atmosphere of smoke and noise, petrol exhaust and more noise, with neither time nor inclination to note the buildings we pass, the destruction of that which is fine and its replacement by the mediocre, or to complain of the smoke and its dire effects, except perhaps on those days when fog causes interference with our petty personal plans or comfort.

Books Received

- THE NATIONAL PHYSICAL LABORATORY. Report for the year 1929. London : H.M. Stationery Office. Pp. 298. 11s.
 REPORT OF THE WATER POLLUTION RESEARCH BOARD, for the year ended June 30, 1929. London : H.M. Stationery Office. Pp. 24. 6d.
 AN INTRODUCTION TO ORGANIC CHEMISTRY. By E. J. Holmyard. London : Edward Arnold and Co. Pp. 280. 4s. 6d.

Basic Industrial Minerals : No. IX.—The Sands.

By G. Malcolm Dyson, Ph.D., A.I.C.

It is not uncommon for chemists to associate the term "sands" with the chemical compound silicon dioxide, and to leave the matter at that. From an industrial and geological standpoint, there is no more widely spread group of mineral substances, and we find in the various sands the raw material for a host of industries. It is true that the basis of sand is quartz or a similar form of silicon dioxide in the form of grains but it is the presence or absence of other ingredients that makes the sand of value or otherwise.

Sands may be classified either according to the nature of the minerals of which they are composed, or with regard to the size of the particles of which they are formed. Thus, very small particles from 0·01 to 0·025 mm. in diameter are termed silt, the term sand proper being reserved for the description of particles 0·025 to 2·0 mm. in diameter. The true sands are usually graded into three sizes, "dust sand," with particles of 0·025 to 0·04 mm. diameter; "fine sand," the diameter of the particles falling between 0·04 and 0·33 mm.; and "coarse sand," the particles of which are 0·33–2·0 mm. in diameter. Material with particles larger than 2·0 mm. comes under the classification of "fine gravel."

Geological Considerations

The minerals from which sands are derived are many and various; among volcanic rocks we find sands derived from the trachytes, from phonolite and from basalt; among the hypabassal rocks, porphyry and dolerite are capable of giving rise to sands, as are also the granites, syenites, diorites and gabbros. Further, there are sands of peculiar natures derived from various organised materials, such as coral sands, shell sands, foraminiferal, radiolarian and diatomaceous sands; again, in the coal measures of N. Lancs, Derby and Durham there is found a variety of so-called "coal sand," a ganister which is mainly utilised in the Sheffield district.

Sands may also be divided into two classes according to the method by which they are naturally formed; the hypogenic sands being formed by heat and chemical action below the surface, while the epigenic sands are formed by erosion and weathering. For the purposes of these articles it is proposed to adopt an industrial classification and to discuss the sands from the standpoint of the purposes for which they are used. Sands, considered from this point, fall naturally into four groups:

(1) *Constructional Sands*, including the sands for brick-making, mortar, cement, road construction, plasters, and artificial stone.

(2) *Metalurgical Sands*, including those used for foundry work, the extraction of metals, furnace linings and refractor compositions.

(3) *Chemical Sands*, used for industrial filtration, glass manufacture, pottery, and for agricultural use.

(4) *Abrasive Sands*, used in sand blasting and in grinding.

Physical Properties

Before proceeding to discuss each of these classes in turn, it is necessary to deal with the general properties of sands from the physical and chemical standpoints. The various minerals which occur in sands have such an enormous influence on the useful properties of the sand that they have themselves been the subject of considerable research. Silica (silicon dioxide), which is the basis of many sands, forming about 60 per cent. of the earth's crust, is an interesting example of chemical association. The compound SiO_2 ought, from various considerations, to be a gas; the various forms of silica which occur in nature are therefore better represented by the formula $(\text{SiO}_2)_x$, where x is a comparatively large number. An examination of silica shows that it can occur in numerous distinct physical forms, varying from the amorphous varieties to the three crystalline varieties known as quartz, tridymite and cristobalite, each of these existing in a stable and an unstable form.

The amorphous forms of silica comprise three fairly important minerals, opal, geyserite and flint, together with the less important varieties carnelian, chalcedony, onyx and agate. Flint is precipitated amorphous silica, and arises by the slow deposition of silica round some very small nucleus such as a

particle of organic matter or a microscopic shellfish. Flints contain on an average 95 per cent. of silica, and are frequently met with in the form of an intimate mixture of amorphous silica and quartz. It is not often that flint is found in sands.

The crystalline varieties of silica are mainly found naturally as quartz—cristobalite and tridymite being uncommon. There are many minerals which are more or less modified forms of quartz, most of which weather to a sand consisting of irregular quartz grains mixed with other minerals in varying proportion, mainly mica, felspar, magnetite, rutile, zircon, garnet and tourmaline.

General Properties

The chemical composition of sands varies so considerably that it is best discussed under the various sections to which the particular sands belong. The colour of sands is of very little importance, unless it is the orange or yellow colour due to iron oxide, in which case it may have an important influence on the value of the sand for glassmaking; other optical properties such as transparency and refractive index are important only from the analytical standpoint, the latter property being of the utmost importance in estimating the amounts of the various sands present in a sample. Thus, for example, in a sand which contains monazite, zircon and silica (as quartz), a microscopic "count" of the grains of varying refractive index will give a good guide as to the proportions of each mineral present, since the refractive indices of the three minerals are 1·84, 1·99 and 1·55 respectively.

The hardness of a sand depends on the various constituents, and usually ranges between 6 and 7 on Mohr's scale. It is a useful indication of the value of a sand as an abrasive, but it is often less important than the texture of the sand as calculated by the "surface factor." The calculation of the surface factor may be done in many ways. An essential is the grading of the sand into particles of various diameter by sieves. The calculation of the "surface factor" is best explained by means of an example. We will suppose that the grading of a sand worked out thus:—

SIZE OF PARTICLE	PERCENTAGE	N.	PERCENTAGE $\times N$
0·01–0·025	3	3,367	10,101
0·025–0·04	10	962	9,620
0·04–0·033	7	518	3,626
0·033–2·0	80	91	7,280
			30,627

The percentage of each size particle is multiplied by a factor (designated by "N" in the table), which represents the average surface of particles in the particular class to which it applies. The figures so obtained are added up and divided by 100, giving in the case of the sand above the value 30·627 as the surface factor. This value is nearly always quoted in connection with foundry sands, but actually means very little. The "surface factor" tells very little about the constitution of a sand unless read together with the grading table, since the same surface factor might be arrived at by taking two sands, one with silt and coarse sand, and the other a uniform medium sand. The texture of a sand depends also on the shape of the grains, which can be estimated by microscopic examination or by estimation of the porosity.

Porosity and Permeability

The porosity of a sand is best expressed as the volume relation between the space occupied in the dry sand by air and mineral respectively. Thus, a sand which has a porosity of 30 will contain 30 per cent. of air space. The porosity of a sand may be calculated by observing the volume of water taken up by one volume of the dry sand before saturation is reached. This represents the air space, and a sand 100 c.c. of which absorb 50 c.c. of water has a porosity of 50.

This value may be determined with great ease in the following way:—The dry sand is carefully poured into a 1,000 c.c. measuring cylinder until the 500 mark is reached. From another cylinder 500 c.c. of water are added; had the sand been free from air voids the level of the water in the cylinder would have been 1,000 c.c. actually it will be about 900. The difference represents the volume of the air voids in 500 c.c. of sand.

The permeability, a quality which is often confused with the porosity, represents the ease with which liquids and gases can pass through the sand. The permeability varies roughly with the amount of clayey particles present in the sand, and is a very useful property to measure in connection with moulding sand and those intended for use in filter beds. The permeability is usually taken as the time in which 100 c.c. of water pass through a cylinder 1 in. in height and 3 in. in diameter, the water being kept under a uniform head of 40 in. The sand is placed between filter paper of a very open texture, and is packed into the test cylinder under conditions which are as nearly as possible those under which it is to be used in actual practice. Thus filter bed sand should be packed wet under its own pressure, but moulding sand must be tamped down.

When sand is to be used for the manufacture of bricks,

or for the preparation of refractories, the behaviour of the sand on heating is of importance. Thus, in the case of sands which shrink very considerably on heating, some means must be taken to stiffen them up before baking takes place. The presence of impurities always tends to lower the point at which the quartz softens, but the only way of estimating the refractory nature of a sand is to form it into a cone with dextrin paste and to heat the cone with a range of Seger cones in the furnace. The cone which bends in the same way as the standard cone will indicate the temperature of softening.

The mechanical properties of the unmanufactured sand are difficult to determine and of very little value. The tensile and transverse breaking strengths are sometimes determined by mixing the sand with a standard Portland cement binder, and breaking the test piece so obtained after a definite length of time.

Softening Agents and Nitrocellulose Lacquers

Effect on Viscosity and Sensitiveness to Light

DRS. HANS WOLFF and B. Rosen report the results of some interesting work in regard to the effect of softening agents on the properties of nitrocellulose lacquers. Although much work has been done on the solubility of nitrocellulose, and on the effect of solvents on the viscosity of the solutions, yet very little is at present known as to the action of softening agents in this respect. It is clear, however, that softening agents largely affect the solubility, or more strictly the miscibility, of nitrocellulose solutions with non-solvents or fillers, and certainly change the viscosity. And even if softening agents are not as a rule chosen precisely from this point of view, yet it seems of some importance to appreciate the order of magnitude and the kind of changes which are to be anticipated here. Assuming equal behaviour in other respects, there can be no doubt that a lowering or raising of viscosity by different softening agents will prove a deciding factor.

The Tests

Tests were made with four of the more important softening agents, namely tricresyl phosphate, dibutyl phthalate, Sipalin MOM, and Sipalin AOM, using for each part by weight of nitrocellulose (Wasag-Wolle 8) 0·25, 0·5, and 1 part of softener respectively, in three series dissolved with butyl acetate, toluol being gradually added until the solution gelatinised. The end concentration of the solution was always 10 per cent. of nitrocellulose. Without softener the miscibility was 2, that is to say, with a ratio of toluol:butyl acetate above 2 the solution gelled when the concentration was 10 per cent. nitrocellulose.

With a softening content of one-quarter of the nitrocellulose present, namely 2·5 per cent. of the total lacquer, the ratio in every case remained unchanged; with a softening content of half, the ratio, in the case of dibutyl phthalate and tricresyl phosphate, was increased to 2·6; with a softening agent content of one (*i.e.*, equal to the nitrocellulose content), the ratio remained unchanged in each case with the exception of Sipalin AOM. The viscosity of non-gelatinising solutions was of course very high, so that these solutions can hardly be regarded as of practical importance, with the possible exception of tricresyl phosphate and dibutyl phthalate when added in amount equal to the nitrocellulose content.

Viscosity Considerations

If we take it that the ratio of toluol to butyl acetate is in every case 2, and determine the viscosity of the solutions with a Vollmann-Mallison viscosimeter, we shall get a clear idea of the action of softening agents on viscosity, reckoning the viscosity of the pure nitrocellulose solution at 100 and the absolute time maximum at 1,130 seconds. The following table gives the percentage composition of the lacquers, the viscosities being graphically given on the accompanying curve (Fig. 1):

PERCENTAGE COMPOSITION OF LACQUERS.

Ratio Softener-Nitrocellulose.....	1/4	1/2	1
Nitrocellulose per cent.	10	10	10
Softening agent	2·5	5	10
Butyl acetate	29·2	28·3	26·7
Toluol	58·3	56·7	53·3

From the curve it will be seen that the viscosity of solutions in which R (ratio of softening agent to nitrocellulose) is $\frac{1}{4}$ falls to between 60 and 30 per cent., the minimum decline being with Sipalin MOM and the maximum with Sipalin AOM.

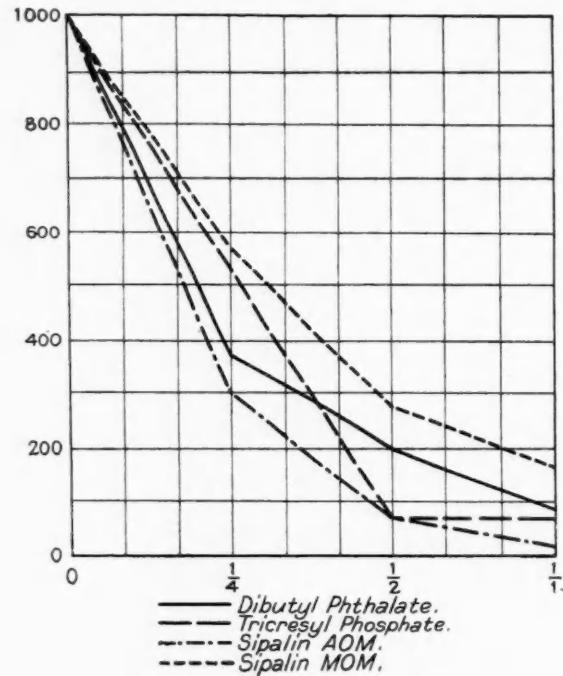


FIG. 1. VISCOSITY OF SOLUTIONS.

With R equal to $\frac{1}{4}$ the viscosity falls a further 25 to 0·5 per cent., the minimum being again with Sipalin MOM and the maximum with Sipalin AOM, the latter being shared with tricresyl phosphate. With R equal to 1, there is only a small additional fall in viscosity, none in fact with tricresyl phosphate, whilst Sipalin MOM falls slightly to 15 per cent. and Sipalin AOM drops to 2 per cent. of its original viscosity. These results are important, as they show that whilst one particular softening agent may not greatly affect the miscibility, yet another, not far removed in amount from the maximum possible percentage of mixer (non-solvent) may so affect viscosity that this is considerably less than it would be with a softening agent of vastly greater action on miscibility. It is further shown that the nature and amount of the softening agent may have greater effect on viscosity of a nitrocellulose lacquer than the solvent used, or at least may have an equal effect.

Effect of Benzene on Solubility

In a second series of tests the effect of benzene on miscibility was similarly investigated. In this case there is no true gelling as with toluol, but rather separation or precipitation. The point of maximum miscibility is not therefore determinable. The end concentration was 6 per cent. The ratio of benzene (light) to butyl acetate at which precipitation or settling took place with a lacquer containing no softening agent was 1.4. In Fig. 2 the results are graphically depicted. Change in

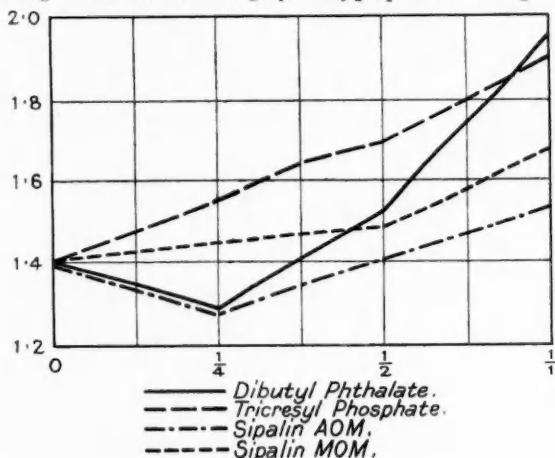


FIG. 2. EFFECT OF BENZENE ON MISCIBILITY.

degree of miscibility is not so remarkable as would appear from the scale of diagram chosen. The minimum and maximum ratios are 1.3 and 1.96, and it is interesting to observe that, in the case of dibutyl phthalate with small addition (of benzene), the miscibility is somewhat lowered, even though to a slight extent. But it rises again, with further addition of benzene, to an even greater degree than tricresyl phosphate, although this latter, even with the smallest ratio (one-fourth of nitrocellulose content) showed a marked increase in miscibility.

Small Difference Between Softeners

The difference between the individual softeners is, as already remarked, practically very small. With a content of one-quarter softener, the minimum content of butyl acetate is 32.7 per cent. and the maximum is 37.8 per cent.; with a softener content of one (equal to that of nitrocellulose) the percentages are 27 and 30. Therefore, with the most effective softener, no greater saving than 3 per cent. of butyl acetate can be made. These figures apply to miscibility up to the point where settling begins, a point which may be designated as that of "apparent miscibility." As is the case with solvents, those lacquers which contain softeners obviously do not dry clear at this point of "apparent miscibility," and the conditions at which clear drying takes place have therefore been determined.

But the clear drying solutions do not yield lacquers of much practical use, for most of them exhibit in a marked degree the so-called orange-peel appearance. Therefore the further step has been taken of determining for these lacquers the proper ratio at which this orange-peel phenomenon is not seen.

In the following table the ratios for the three following states (1) apparent miscibility or A.M., (2) true miscibility or T.M., and (3) clear smooth drying miscibility or S.D.M. are shown.

	A.M.	T.M.	S.D.M.
Without softener	1.4	0.9	—
With one-fourth softener			
dibutyl phthalate	1.3	1.08	—
tricresyl phosphate	1.58	1.08	—
Sipalin MOM	1.3	1.08	—
" AOM	1.46	1.08	—
With one-half softener			
dibutyl phthalate	1.55	1.28	1.02
tricresyl phosphate	1.69	1.28	0.82
Sipalin MOM	1.44	1.28	—
" AOM	1.51	1.28	1.02
With 100 per cent. softener			
dibutyl phthalate	1.96	1.47	0.9
tricresyl phosphate	1.89	1.47	—
Sipalin MOM	1.56	1.47	0.9
" AOM	1.68	1.47	—

These results are of interest. Whilst the apparent miscibility with the three varying contents of softener shows marked differences it will be observed that the true miscibility is largely independent of the precise kind of softener, but rather is dependent on the amount thereof. By increasing the amount of softener from zero to one-fourth of nitrocellulose content, from one-fourth to one-half, and from one-half to unity the true miscibility is only increased in each case by 0.2.

It may at first sight seem rather strange that the orange-peel effect only emerges with high softener content. It is here that the greatest differences between the various softeners show themselves, but even this is mainly dependent on the quantity present. With a softener content of half, Sipalin MOM has the highest miscibility (S.D.M. or smooth drying), and tricresyl phosphate the lowest; some other results may be easily read from the table and curve.

Choice of Softeners

It is obvious from the foregoing that softening agents must be chosen from various points of view. For most purposes, however, it is possible to select the most economical and efficient agents with the help of the above given factors. For instance, the substitution of 10 per cent. butyl acetate by benzene, with equal concentrations of lacquer body, may often be possible and certainly more economical.

Effect of Softener on Yellowing Light Effects

A further important point is the sensitiveness of nitrocellulose lacquers to light. It is known that many of these lacquers show a marked tendency to turn yellow under the action of light, and it is also known that the extent of this yellowing is not unassociated with the softening agent used. Two hypotheses may be advanced to explain this: (1) It may, in the first place, be assumed that the yellowing is caused by a partial fission of the nitro group, and that certain softeners favour this fission, or discourage it, or have an injurious effect on the group split off; (2) In the second place one may suppose that, owing to a specific light absorption effect by the softening agent itself, exerting a selective action on certain rays, the net effect on the nitrocellulose is reduced.

In these tests the same softeners were used as in the viscosity tests. In order to determine the quantitative effect the softener was used in three different proportions as before, namely 1/4, 1/2, and 1/1, in relation to the total nitrocellulose content. Butyl acetate was used as solvent and toluol as diluent, and in such proportions that, with all the lacquers, a good drying film was obtained; that is to say, with a smaller quantity of non-solvent or diluent than would correspond to the above designated S.D.M. Glass plates were coated with the lacquers, and after drying the plates were exposed for six hours to the light of a mercury quartz lamp, without filter, at a distance of 30 cm. As a control, a glass plate was used smeared with a nitrocellulose solution containing no softener and irradiated in the same way.

The results are given in the table below in which arbitrary numerical values are assigned to the various stages of colouring or yellowing, i.e., 0 means no perceptible colouring; 1, scarcely perceptible colouring; 2, moderate degree of colouring; 3, strongly marked colouring; and 4, very strongly marked colouring. The nitrocellulose solution formed a film which was only slightly coloured, but brittle and flaky or peeling readily.

CONTENT OF SOFTENER	DIBUTYL PHTHALATE	TRICRESYL PHOSPHATE	SIPALIN MOM	AOM
1/4	2	3	0	0
1/2	3	3	1	0
1/1	3	4	1	1

The results are significant. Both Sipalins show much less colouring than the other two softeners. Even with the maximum addition of softener, the colouring, when Sipalin is used, is much less than is the case with dibutyl phthalate with minimum softening agent. The worst case is that of tricresyl phosphate. Besides colouring, the lacquer films in this last series showed a marked tendency to crack. With Sipalin MOM, this was almost immediately apparent after radiation, and with the others it appeared a few days after. It appears, therefore, that a high content of softener seriously prejudices the resistance of the films to light effects, whereas a smaller content of softening agent increases this power of resistance. At the same time, a solution without softener gives films with a minimum resistance to light. (*Farben-Zeitung*, pp. 2564-6).

Industrial Gas Masks and Their Construction

By S. H. Katz

While working in England on a joint study conducted by the Safety in Mines Research Board of Great Britain and the United States Bureau of Mines, the writer, formerly chemist in charge of the gas-mask laboratory, Pittsburgh Experiment Station, U.S. Bureau of Mines, now with the Chemical Warfare Service, Edgewood Arsenal, Maryland, U.S.A., had an opportunity to visit some of the plants manufacturing industrial gas-masks and self-rescuers, as well as some of the mine rescue stations where gas-masks were tested for their proposed use in mines. This paper describes some of the industrial gas-masks made outside the United States, and the manufacturing plants, organisations, and laboratories dealing therewith, especially the carbon monoxide gas-masks proposed for use in mines.

THE gas mask used in American mines is of the universal type and is known as the All-Service. This mask has been tested and officially approved by the U.S. Bureau of Mines. It consists of four main parts: (1) The facepiece, (2) the timer, (3) the canister, and (4) the harness to support the canister on the wearer's chest.

The canister (illustrated below) contains granular adsorbents arranged in the following order, which retains all types of poisonous gases:—(1) Activated charcoal impregnated with copper sulphate, 400 c.c., restrains ammonia gas and also some gases classed as organic vapours; (2) Activated charcoal unimpregnated, 200 c.c., restrains organic vapours; (3) Caustic, 200 c.c., a caustic soda preparation, restrains acid gases; (4) A filter of absorbent cotton restrains suspensoids, including

approaching the hopcalite; (8) Another filter of absorbent cotton.

Many special-purpose gas masks to protect against a single gas or only two or three gases or classes of gases are made and used in the United States.

Gas Masks in England

Industrial gas masks are manufactured in England by Siebe, Gorman and Co. This firm builds the well-known Fleuss-Davis "Proto" machine, an oxygen-breathing apparatus employed by most mine rescue organisations in the British Isles and used in many other parts of the world. This firm also manufactures apparatus for deep-sea diving and appliances to supply aviators with oxygen at high altitudes, oxygen apparatus for reviving, gas masks, respirators, and other products. It has developed carbon monoxide gas masks and also distributes the All-Service mask.

The carbon monoxide gas mask as developed in England has not been marketed to any considerable extent. The canister has, however, been partly described in the literature by Levy and West. It contains essentially five absorbent materials: (1) Calcium chloride to remove water vapour; (2) Hopcalite to cause oxidation of the carbon monoxide, followed by another layer of calcium chloride; (3) A thin layer of iodine pentoxide and fuming sulphuric acid on pumice stone granules for the purpose stated hereafter; (4) Animal charcoal; and (5) Filters of asbestos "lap" to restrain suspensoids as well as fumes of sulphur trioxide from the fuming sulphuric acid.

The iodine pentoxide and fuming sulphuric acid on the pumice granules is called "hoolamite" after the inventors. It oxidises carbon monoxide at low temperatures with release of iodine. When the hopcalite in the canister after a period of usage begins to pass some carbon monoxide, the hoolamite reacts with the carbon monoxide, iodine is freed, and some of the latter permeates the air being breathed. This iodine warns, by its mildly irritating effect on the nose and throat, of the escape of carbon monoxide.

Special Purpose Gas Mask

Many gas masks manufactured by Siebe, Gorman and Co. for gases other than carbon monoxide, as well as respirators for dusts, are used in British industry. The facepieces of the British industrial masks are of the Tissot type, as are the American. The British facepiece is formed of a single piece of rubber by moulding on forms; they are made with and also without fabric covering. Most other features are comparable with those of the American facepieces.

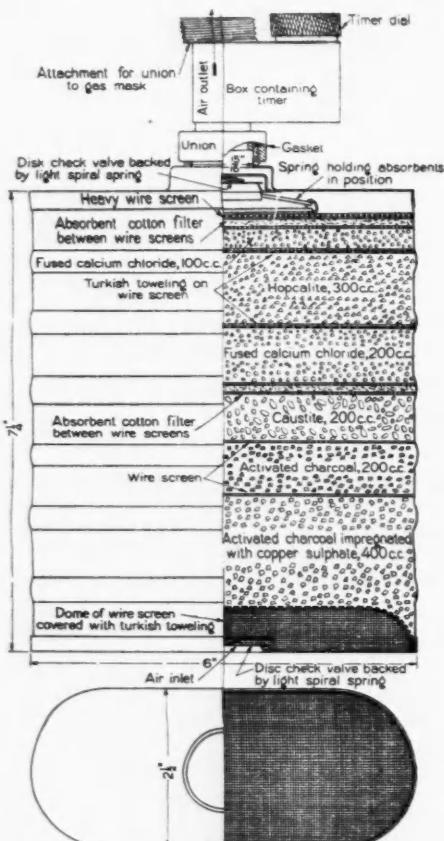
Two dust respirators manufactured by Siebe, Gorman and Co. are relatively high in filtering efficiencies and low in resistance to air flow, as indicated by tests in the gas masks and respirators laboratory of the Bureau of Mines at Pittsburgh; these, called "pulvalifta" respirators, were developed by R. H. Davis and C. G. Rosling in the company's laboratory.

S.M.R.B. Gas-Mask Laboratory

The Safety in Mines Research Board of Great Britain installed a gas-mask laboratory in its new building in Sheffield in which to carry out research on the construction of carbon monoxide gas masks. A device called the "S.M.R.B." gas mask with a canister holding 1,500 c.c. of absorbents like those in the Universal gas mask of the Bureau of Mines, was developed at the Sheffield laboratory.

Gas Masks in Germany

Gas masks are used widely in Germany by fire departments and the industries, but not yet in mines. The former especially are generally equipped, and nearly every fireman in Germany has a mask. The most popular mask is based on the



DETAILS OF CANISTER FOR "ALL-SERVICE" GAS-MASK USED IN MINES IN THE UNITED STATES.

the smokes, dusts, and mists; (5) Fused calcium chloride, 200 c.c., restrains water vapour, which is harmless to breathe, but its removal is necessary because it inhibits the action of the next material, hopcalite; (6) Hopcalite, 300 c.c., is a specially prepared mixture of manganese dioxide and copper oxide; it serves as a catalyst, causing the poisonous carbon monoxide, if present, to unite chemically with the oxygen in the air to form carbon dioxide, which is not poisonous; (7) Calcium chloride, 100 c.c., prevents moisture above from

German army mask used during the World War. It has a leather facepiece and a drum-shaped canister directly attached by a threaded male and female joint to allow changing the canisters. The headbands are of fabric with small spiral metal springs enclosed for elastics. Facepieces are also made of rubber and of rubberised fabric.

The drum canisters are made with adsorbents in considerable variety for specific gases and classes of gases; moreover, a general purpose canister especially for fire departments restrains all classes of poisonous gases and smokes but carbon monoxide.

German Carbon Monoxide Masks

Canisters to restrain carbon monoxide are also made in Germany. The writer had an opportunity to wear a carbon monoxide gas mask during a chamber test in 1 per cent. of the gas and was well protected. He has not, however, examined the interior construction of the canisters for removing carbon monoxide, and no exact description is given in the published articles that have appeared. The carbon monoxide canister is rather large, 8·5 by 16·5 by 24·5 c.m. in size, and weighs 3 kilograms (6·6 pounds). Air enters at the bottom as it is worn, passes through two separate layers of calcium chloride or other drying material, and then through a layer of hopcalite, where the carbon monoxide is caused to unite with oxygen to form carbon dioxide. A layer of alkaline granules then removes the carbon dioxide. This is followed by a second layer of hopcalite to remove any further traces of carbon monoxide passing the first hopcalite. Then there is another layer of drying material. The last layer includes some granular calcium carbide to give warning of the exhaustion of the hopcalite by evolving acetylene when water vapour begins to penetrate the hopcalite and react with the calcium carbide. The odour of the acetylene informs the wearer of the approaching end of the usefulness of the canister, but it is stated that the canister may still be used one quarter as long as previously before dangerous quantities of carbon monoxide penetrate.

According to Bunte, the carbon monoxide canister also protects against hydrogen cyanide, ammonia, hydrogen sulphide, phosphine, arsine, sulphur dioxide, ethylene, benzene and some other gases. Wollin states that the life of the canister in use against carbon monoxide is 15 to 30 hours. Laboratory tests against moist or dry air containing carbon monoxide have shown the life to be at least 8 hours and possibly more.

Two manufacturers are producing gas masks in Germany, the Deutsche Gaslühllicht Auer Gessellschaft, with offices in Berlin and factory at Oranienburg; and the Drägerwerk of Lubeck.

Gas Masks in France

The Carteret Laboratoires of Paris, with a factory at Boulogne-sur-Seine, manufacture industrial gas masks, including a carbon monoxide gas mask. These masks are used above ground in many industries. The carbon monoxide mask has been used underground quite extensively by workers in long railroad tunnels but not as yet in mines. The fire departments in France also have not used gas masks. The Carteret and foreign-made carbon monoxide masks received consideration from the Comité Central des Houillères de France at their laboratory at Montluçon, in view of their possible use in mines.

Description of Carteret Gas Masks

The Carteret gas masks are made in two forms, one with a small drum canister attached direct to the facepiece and the other with large canisters, which are supported on the wearer's body and connect to the facepieces through flexible rubber tubes. The carbon monoxide gas mask has two cylindrical canisters joined by a tube below. The canisters are carried in the pockets of apron supports on the wearers. Inspired air enters one canister through an opening at the top, passes downward through a reactive mixture of iodine pentoxide and sulphuric acid on pumice granules (proportions are pumice 1 litre; concentrated H_2SO_4 , 60 c.c.; I_2O_5 , 120 g.), where any carbon monoxide is oxidised to carbon dioxide. Iodine passes with the air to the second canister and is removed there by an absorbent of granular charcoal, an alkaline granule,

or mixtures of these. The apparatus also restrains various other irrespirable gases.

Gas Masks in Belgium

When the writer visited Belgium no industrial gas masks were being manufactured there. The industries and fire departments were, however, using some masks imported from other countries. Carbon monoxide gas masks and self-rescuers for use in mines had been investigated and some tests thereof had been made at the Institut National des Mines à Frameries. One manufacturer, Etablissements Jules Fonson, of Brussels, is developing some industrial gas masks. The firm now manufactures saddlery and military accessories, but heretofore has made parts of gas masks for military purposes. It expects to have some complete masks under production that will be adapted to Belgian industry above ground.

The above article is based on information contained in U.S. Bureau of Mines Information Circular 6,206.

Storing Dangerous Chemicals

Claim for Breach of Contract

In Southwark County Court, on Tuesday, before Judge Moore, Burins Express Services, of 13, Duke Street, London Bridge, general carriers, sued the Dearborn Chemical Co., Ltd., of Criterion Buildings, 24-36, Regent Street, engineers and chemists, to recover £58 10s. for alleged breach of contract.

Mr. White, counsel for the plaintiffs, said that the defendants were a foreign company, incorporated in America and Canada, where they manufactured chemicals. The defendants were represented in England by a company called the Lewis Exhaust Governor Co., Ltd., and the plaintiffs had an agreement with that company to store chemicals at their warehouse at London Bridge. In 1926, the Lewis Exhaust Co. went into liquidation, and the defendants then approached the plaintiffs direct, with a view to continuing the agreement as to storage. The plaintiffs agreed to store between 30 and 40 tons at £4 10s. a week, payable monthly, but on the same terms as with the Lewis Exhaust Co., under which three months' notice was to be given on either side. In February of this year, the defendants inquired about storing an additional 30 tons of a special chemical made up under a secret formula, and the plaintiffs said they would do so for an extra £2 a week, but they received a letter from the plaintiffs giving a week's notice, and saying the defendants were going to take a warehouse of their own.

Matthew Burrin, trading as the plaintiff company, said that Mr. Buchanan was engineer to the Lewis Exhaust Co., and when they went into liquidation, he became the manager of the London branch of the defendants. The goods stored mainly consisted of chemicals to prevent the incrustation of boilers. They were of a dangerous nature, and were in glass carboys and drums. These sorts of goods were actually refused at the docks, where they had to be cleared away immediately as they were corrosive. Sulphuric acid was one of the ingredients of the secret formula. If he had given the defendants a week's notice, it would have been impossible for them to have found other storage space in the time. Mr. Buchanan told him that the directors in Chicago and Toronto were contemplating starting a chemical factory in this country, but he had advised them that the present time was unsuitable to commence operations. The defendants then found that one of their preparations were suitable for certain purposes, and required him to carry an additional 30 tons and he said he would make arrangements for £2 a week extra, but this offer was turned down, and he was later given a week's notice of their intention to remove their whole stock of chemicals.

Evidence was given for the defence that the arrangement was a weekly one, which was terminable by a week's notice. It was denied that there was any attempt to adhere to the former agreement which had been made with the Lewis Exhaust Co.

Judge Moore, in giving judgment, said he had examined the case from all angles, and considered the plaintiff's story to be right, and that the agreement was that there should be three months' notice on either side, which he considered was borne out in the correspondence. In the circumstances, he would give judgment for the plaintiffs for the amount claimed, and costs.

A Bookman's Column

Modern Methods of Cocoa and Chocolate Manufacture (London: J. and A. Churchill, pp. 316, 21s.), by H. W. Bywaters, aims at giving "a plain, unvarnished account of modern methods of manufacturing these well-known products," and makes a useful addition to the rather limited literature on the subject. The author deals first with the raw materials, describes the various modes of manufacture (selecting for description the machines he has himself found satisfactory), and adds some chapters on chocolate moulding, the cause and prevention of maggot, and the examination of cacao products. The volume indicates the immense size and importance of the industry, and the part that applied chemistry has played in its development. It may be commended as a thoroughly practical handbook. To avoid confusion between the cacao-bean and coconut, the word "cacao" is taken to mean the raw material up to and including the press-cake stage; "cocoa," cocoa powder; "chocolate," a refined mixture of cacao and sugar with or without the addition of cacao-butter.

* * *

Some Writers on Lime and Cement (Cambridge: W. Heffer and Sons, pp. 287, 15s.) is an example of unusual diligence in reading and compilation. It includes brief accounts of over 300 persons, beginning with Cato, 234-149 B.C., who have published books or made contributions on the subject. Mr. Charles Spackman, the author, describes the book as an outcome of a long life largely devoted to the chemistry and technology of lime and cement, as employed for purposes of building and engineering construction. He has arranged the writers' names in chronological order, and where he has had access to their writings has indicated their nature. Much early work is recorded in publications dealing with constructional matters, and this discloses some of the expedients resorted to before the invention of Portland cement. How far such a volume will be drawn upon for practical purposes is not certain, but it was certainly an interesting and courageous idea to collect and publish such a record. The author and subject indexes make the mass of information readily accessible.

* * *

The index for 1929 to *British Chemical Abstracts*, issued and published by the Bureau of Chemical Abstracts, indicates as impressively as anything could the immense range and incomparable scientific value of the work carried on under the direction of the Bureau, with Professor J. C. Philip as chairman, Mr. T. F. Burton as editor, and Miss Margaret le Pla as indexer. The index, which occupies 641 pages, covers the abstracts of papers in pure chemistry (section A) and applied chemistry (section B) and also contains a list of journals from which abstracts are made and an index of numbers of patents abstracted. Such work calls for uncommon standards of application, exactitude, and knowledge, and is only possible to highly trained experts in the difficult technique of abstraction. The thoroughness with which it is done entitles the army of unknown workers upon whom it falls to the gratitude and admiration of all concerned in chemical literature, and its applications.

* * *

The latest addition to the series of monographs on applied chemistry, which Dr. E. H. Tripp is editing, is a volume on *Solvents*, by Dr. Thos. H. Durrans, chief of the research laboratories of A. Boake, Roberts, and Co. (London: Chapman and Hall, pp. 144, 10s. 6d.). The chemistry and industrial applications of solvents have of late advanced enormously, especially in connection with the cellulose-lacquer industry, and the author's aim has been to state in a concise form the scientific and fundamental aspects of the subject and to show the relations of these aspects to technical usage. The work is marked by clarity, conciseness and practical knowledge.

* * *

With the issue of volume II, Dr. J. A. Wilson's second edition of *The Chemistry of Leather Manufacture* is completed (New York: Chemical Catalog Co., pp. 1181, \$10.00). This is now three times the size of the first edition, much of the older work having been greatly expanded and many new fields covered. It was intended to include a chapter on the disposal of by-products and wastes, but considerations of space precluded this. The author, however, is far from satisfied with

the scope even of the enlarged second edition. He speaks of the possibility of expanding the entire work to ten or twelve volumes, each the size of the present one, and of the incalculable value of such a work to the leather industry. *The Chemistry of Leather Manufacture* is included in the American Chemical Society Monograph series.

* * *

Another volume received from the same publishers is Dr. Ernst A. Hauser's *Latex: its Occurrence, Collection, Properties and Technical Applications*, with a patent review compiled by Dr. C. B. von Boernegg (pp. 201, \$4.00). The translation from the German has been efficiently done by Dr. W. J. Kelly, of Philadelphia.

* * *

The Soya Bean and the New Soya Flour (London: W. Heinemann, pp. 79, 6s.) is a revised translation from the Dutch of the original work by C. J. Ferrée. The soya bean has acquired considerable importance in recent years, and the author not only describes its characteristics and methods of cultivation, etc., but particularly emphasises the discovery of a new and valuable domestic foodstuff in the shape of soya bean flour.

A TREATISE ON CHEMICAL ENGINEERING: applied to the flow of industrial gases, steam, water and liquid chemicals. By Geoffrey Martin, D.Sc. London: Crosby Lockwood and Son. pp. 424. £3 3s.

The author has attempted to provide the chemical engineer and works chemist with scientific methods for estimating the flow of all kinds of fluids in industrial plant. He has tried, quoting from the preface, "to make all explanations and subject matter as simple and clear as possible, so that the wording of any mathematical argument is made as easy to follow as possible." Opinions will differ on the extent of his success. The book is very original, almost annoyingly so. One feels the suggestion, especially in the practical examples and some of the diagrams, that the reader is a very stupid person without imagination and little common sense.

A departure from ordinary practice is pagination by the chapter, which is hardly justified by the fact that several chapters deal with one subject. Nearly one quarter of the book consists of tables, all of them useful, some of them excellent, but 17 pages giving areas of circles and 49 pages filled with volumes of 1 lb. and weights of 1 c. ft. of eight gases at different temperatures do suggest a waste of space in a very expensive book. One feels, in fact, that there is an absence of that efficiency which the author evidently desires to produce.

The vexed question of units also arises, and the author blames American practice for his deliberately using the English system of units including the Fahrenheit scale. It is not a good excuse, and it is not in the best interests of the student nor of progress. The fact that all chemical and physical data are given in C.G.S. units is a more powerful reason for breaking away, at any rate, from the Fahrenheit scale.

The prolix character of the work is deliberate, for the author says in his preface: "It saves the time of the reader if the meaning is put clearly in three lines, which are grasped in three seconds, rather than be condensed into one line, which will be puzzled about for one hour." On the other hand, it wastes time to read three lines when one line can be made to give the clear meaning. One is reminded of the tradition of Mr. Mellon and the practice of the Mellon Institute of Pittsburg, U.S.A., that no report will be accepted which occupies more than one sheet of foolscap.

In spite of these criticisms, the book will prove of the greatest value to those for whom it is intended. It will give clearer ideas to those who find it difficult to understand the usual textbook explanations of the Pitot tube, the Venturi meter, the falling of particles in fluids, pneumatic transport, and the flow of fluids in general. The book gives evidence throughout of effort to make the reader thoroughly understand the difficult questions dealt with. The attitude of the teacher is suggested and the use of numerical examples, which the author has adopted, is certainly one of the best methods of teaching.

J. W. H.

Plating of Aluminium for Protection

Results with Fine Cyanide and Sulphate Baths

A paper on the protection of aluminium and its alloys by the deposition of zinc was recently read before the Electroplaters' and Depositors' Technical Society, the work described being based on results of investigations made by Dr. H. C. Cocks at the Royal Aircraft Establishment, Farnborough. Excellent results were obtained with deposits obtained both from sulphate and cyanide zinc baths, although protection from "sulphate" zinc was superior.

DR. COCKS said that previous work on the plating of aluminium has shown that difficulties arise (1) in the preparation of the metal prior to plating owing to the necessity for the removal of the natural oxide film, (2) in the choice of a suitable plating solution owing to the high reactivity of aluminium, especially in alkaline solutions, and (3) in obtaining good adhesion of the deposit to the basis metal.

Sandblasting with fine sand at an air pressure of 5 to 10 lb per sq. in. was found to be the most consistently satisfactory method of preparing the work. In order to avoid local overheating of the metal during this operation the jet of sand was moved about continuously over the surface of the metal. When an article had been sandblasted it was quickly washed with water and plated at once. Sandblasting was found to have the advantage over pickling in caustic soda solution in that it did not leave a "slime" on the surface of the metal. It also gave a somewhat rough surface which was probably of assistance in obtaining good adhesion of the deposit to the basis metal.

Zinc Sulphate Baths

The essential features of the baths used were that they were well buffered, contained a suitable addition agent, and were maintained at a definite value of pH (acidity). The compositions of the solutions used were:—

Zinc sulphate (cryst.)	145 grams per litre	23.2 oz. per gal.
Sodium acetate (cryst.)	35 "	5.6 "
	and either,	
(a) Gum arabic	1 gram per litre	5.6 "
(b) Glucose ..	25 grams ..	4.0 "
(c) Beta naphthol ..	0.1 gram ..	0.016 "
(d) Gum tragacanth ..	0.25 gram ..	0.04 "

On the whole, the solution containing 1 g./l. gum arabic was the most satisfactory, and that containing glucose the next best. The zinc sulphate and sodium acetate were dissolved in water and the addition agent was dissolved in a small quantity of hot water and added to the solution of the salts. Finally, moderately strong sulphuric acid was added to bring the pH to the required value. It was found that the best results were obtained when the work was continuously moved to and fro during the whole time of deposition. The movement was started before the current was switched on and the current was switched off before the movement was allowed to cease. Among the advantages obtained by using moving cathodes were that a higher current density could be used without treeing of the deposits, and the movement of the work through the solution tended to sweep off adhering bubbles of air or hydrogen, and thus prevent or diminish the formation of gas-pits.

Metals plated included commercial aluminium, commercial British duralumin, the sand-cast aluminium alloys, L5, L11, L24 and D.T.D.25, mild steel, copper and brass. Most of the best pieces were flat plates about 4 by 2 in., but some larger pieces of aluminium and duralumin sheet, some duralumin angle-pieces and some sections of aluminium tube cut longitudinally into halves were also plated. In most cases the pH of the bath was 4.0, but experiments were also carried out with baths of pH 5.0. A large number of plated test pieces were submitted to the intermittent sea-water spray corrosion test. Current densities of 10, 20 and 30 amps. per sq. ft. were employed and nearly all the deposits obtained were satisfactory. The tests with the angle-pieces and sections of tube showed that the throwing power of the baths was only fairly good, but indicated that the best power throwing of the baths was obtained with the gum arabic when the pH was 4.0 and when the current density was comparatively high—30 amps. per sq. ft.

Zinc Cyanide Baths

Experiments on the small scale in which observations on the effect of composition of the solutions, current density, etc.,

on the deposits and deposition potentials were made, showed that satisfactory deposits of zinc on aluminium could be obtained from several solutions, the compositions of which were such that their alkalinity was very low. For example, satisfactory deposits were obtained from the following solutions:—(1) Sodium zinc cyanide, (2) sodium zinc cyanide and sodium zincate, (3) sodium zinc cyanide and sodium carbonate, (4) ammoniacal sodium zinc cyanide solutions. As a result of these investigations, two baths were selected for use on a large scale.

The sodium zinc cyanide sodium zincate bath was, of course, of similar composition to those ordinarily used for deposition on steel, etc., but differed from those in that the concentration of free cyanide and hydroxide was much smaller. The composition was:—

	Grams/litre.	oz./gallon.
Zinc cyanide	60	9.6
Sodium cyanide	30	4.8
Sodium Hydroxide	20	3.2

A difficulty which arises in the use of this bath is that due to the formation of adherent coatings of high electrical resistance on the anodes. These coatings seriously hinder the passage of current through the bath and are due to the necessarily low free cyanide concentration. When using the bath, small amounts of sodium cyanide were cautiously added from time to time in order to maintain the small free cyanide concentration. No addition agent was used.

The composition of the ammoniacal zinc cyanide bath was as follows:—

	Oz./gallons.
Zinc cyanide	60 grams/litre
Sodium cyanide	40 "
Ammonia solution S.C.Sb.o.88o	30 ccs/litre

The advantages of this bath were twofold. First, although a coating tended to form on the anodes, it did not adhere to them, and did not appreciably hinder the passage of current through the bath. Secondly, the tendency to the blistering of the deposits was greatly reduced. A disadvantage of the bath was the smell and corrosive action of the ammonia which passed into the air. When this bath had been in use for some time it became necessary to replace the ammonia which had been lost by evaporation, etc.

Results of Corrosion Tests

In corrosion tests, the test-pieces were protected from rain, but exposed to the open air. They were sprayed with sea water for a few minutes, three times a day. After careful observations, extending over two years, it was found that practically all the deposits from the sulphate baths gave very good protection of aluminium and aluminium alloys. No consistently marked differences were found, however, between the deposits obtained from the four sulphate baths, nor between those deposited at 10 or 30 amps. per sq. ft., nor between those from solutions at pH 5.0 or 4.0. It is concluded that deposits from these sulphate baths are very effective in protecting aluminium and aluminium alloys from corrosion. Up to the present (after exposure to the sea-water spray for about one year), it has been found that the degree of protection afforded by the deposits from both of the cyanide baths, although good, is not so good as that afforded, for a corresponding time, by the deposits from the sulphate baths. Contrary to expectation, the deposits from the ammoniacal zinc cyanide bath have not, up to the present, shown any appreciable superiority over those from the sodium zinc cyanide sodium zincate bath. The sulphate baths and both cyanide baths gave deposits affording good protection from corrosion of the mild steel test pieces. The zinc sulphate baths are to be preferred for deposition on aluminium alloys except in the case of plating irregularly shaped articles. On the whole, the sulphate bath containing gum arabic is to be

recommended, the working conditions being a current density of 30 amps./sq. ft. and the solution at pH 4.0.

The Discussion

The Chairman (Mr. Sutton) said there was little information in the literature bearing on the subject matter of the paper since the production of satisfactory electrodeposited coatings on aluminium and its alloys was a very difficult one. Dr. Cocks's work done on behalf of the Electrodeposition Research Committee of the Department of Scientific and Industrial Research had gone a long way to solving the problem. The zinc deposit produced on aluminium and its alloys when subjected to corrosion tests and marine exposure tests had given far better results than they had expected. He thought that there was no doubt these coatings would come to be used in time in industry with excellent results.

Mr. S. Wernick said zinc was probably even more difficult to deposit on aluminium than nickel owing to its higher solution pressure. The important step was the cleansing process;

sand-blasting giving a clean job, but resulting in particles of sand becoming embedded occasionally, and chemical cleaning was, therefore, to be preferred. The cyanide solution having a higher throwing power might be employed to deposit zinc once a layer of zinc was deposited from the sulphate solution, and the combined coating might give the best results. The best protective for aluminium and its alloys was probably aluminium paint.

Mr. B. K. Braund stated that sand-blasting aluminium was advantageous in many respects, and the embedding of particles of sand might be avoided by adjusting the air pressure to a minimum figure. Nitric acid was to be avoided in cleansing aluminium because, although the zinc deposit looked efficient, there was lack of adhesion. The best way of examining zinc deposits on aluminium was by the preparation and examination of sections through a microscope. Duralumin had recently been very satisfactorily protected by coating with a thin layer of pure aluminium, inserting a protective effect on the cut edges of the sheet as well as the surface.

Cement Clinker Setting Retarders Use of Calcium Sulphate

An investigation of the use of calcium sulphate for retarding the set of Portland cement clinker has been conducted by the United States Bureau of Mines, Department of Commerce. A definite control of the time of set of Portland cement is a problem of primary interest. The main purpose of the investigation was to develop a wider field of utilisation for natural anhydrite.

Gypsum and Anhydrite

While it is conceded that the grinding of the proper percentage of gypsum or plaster of paris with Portland cement clinker will bring about a condition that leads to a normal setting cement, it has not been definitely established that natural anhydrite is equally efficient. Some of the gypsum deposits are contaminated by quantities of anhydrite mixed with the gypsum. Other deposits that are now relatively free from this difficulty may be troubled with it within the next generation. Since natural anhydrite, or gypsum, which is mixed with an appreciable amount of anhydrite, is not suitable for the production of calcined gypsum products, a field for the utilization of this material would be of considerable value to the gypsum industry.

In September, 1925, the Bureau of Mines published Serial 2705, giving the results of an extensive series of tests on the retarder problem. This report indicates that mixtures of plaster of paris and anhydrite will generally retard the set of Portland cement clinker, but that straight anhydrite is of questionable value. Twenty different samples of clinker were tested, but only one anhydrite was used in this first series of tests.

It is generally believed that the action of calcium sulphate as a retarder is closely related to its rate of solubility. The rate of solubility, in turn, depends upon the physical and chemical properties of the calcium sulphate, and as there is wide variation in the physical properties of the natural anhydrite obtained from different localities, it seemed that some samples of anhydrite might react differently from others when used as retarders for cement clinker. Consequently, the question arose as to whether or not the results obtained with one sample of anhydrite would be greatly applicable to mill conditions.

Results

The Bureau of Mines undertook a series of tests with three additional samples of natural anhydrite, and one of by-product material, the results of which tests may be summarised as follows:

Better and more uniform results were obtained on samples of cement when the retarder and clinker were ground together than when the clinker and retarder were ground separately. Consequently, the former results should be used primarily to compare the action of different retarders.

Cement retarded with gypsum is more plastic than that retarded with straight anhydrite, and cement retarded with plaster of paris is more plastic than that retarded with gypsum.

Cement retarded with straight anhydrite requires a higher percentage of sulphur trioxide than cement retarded with

gypsum or plaster of paris. It would therefore not be possible to use anhydrite with samples of clinker that require the maximum percentage of sulphur trioxide as gypsum for proper retardation.

The action of plaster of paris differs from that of the other forms of calcium sulphate in that while it requires the smallest percentage of sulphur trioxide to produce a normal-setting cement, larger percentages constitute an excess which produces a quick-setting material.

Tensile Strength

The tensile strength of cement that has been ground with gypsum in a ball mill of 200 pounds capacity is no higher than the strength of cement that has been ground with anhydrite in a similar manner. However, the calcination of the gypsum in the large tube mill changes its properties, so that its reaction when ground at the plant should be similar to that of plaster of paris mixed with clinker in the laboratory. The tensile strength of cement retarded with plaster of paris is consistently higher than that of cement retarded with other forms of calcium sulphate. However, the amount of sulphur trioxide as plaster required for maximum strength may be in excess of the amount that will produce a normal-setting cement.

When anhydrite is mixed with equivalent proportions of gypsum and plaster of paris, a smaller amount of sulphur trioxide is required for normal set than when straight anhydrite is used. However, the required percentage of sulphur trioxide is slightly larger than that when straight gypsum or plaster of paris is used.

Anhydrite and Plaster of Paris

If properly retarded, the strength and plasticity of cement containing equivalent proportions of anhydrite and plaster of paris are practically the same as those of cement retarded with plaster of paris, while the quality of a normally retarded cement containing an equivalent mixture of gypsum and anhydrite is equal to that of cement retarded with straight gypsum. This conclusion is substantiated in mill practice, as many cement plants are using retarders that contain a considerable percentage of anhydrite and are obtaining satisfactory results. There has been a tendency, however, to assume that anhydrite is a successful retarder, while the information available shows only that mixed gypsum and anhydrite may be successfully utilised as a retarder. This conforms to the results obtained in the present investigation.

The results obtained with all three types of natural anhydrite tested were practically the same. The by-product anhydrite used in this series of tests was less effective than the natural anhydrite. The relation between the action of the different forms and mixtures of calcium sulphate noted in this main series of tests is similar to that noted in the former investigation conducted by the Bureau of Mines, in which 20 samples of cement clinker were tested.

More detailed information is given in Bureau of Mines Technical Paper 451, by Ernest E. Berger, which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., at a price of 10 cents.

Duty on White Spirit and Turpentine

Trade Delegates at House of Commons

Representatives of the trades concerned with the use of white spirit and turpentine met interested members of Parliament at the House of Commons on Thursday, May 15, to explain their views with regard to the effect of the 4d. per gallon duty on petrol, which also applies to white spirit and turpentine. The chairman (Mr. Graham White) said a strong case had been made out for the removal of the duty.

MR. S. K. THORNLEY, stating the case for the National Federation of Associated Paint, Colour and Varnish Manufacturers, said that when the hydro-carbon duty, generally known as the petrol duty, was first introduced by Mr. Churchill in the last Government, it embraced paraffin, but after some agitation paraffin was excluded from the duty. White spirit was, so to speak, the next article in the distillation range of paraffin and, in other words, the exemption of white spirit would mean carrying the principle of exemption a little further up the scale in respect of an article which was a little nearer petrol than paraffin. The approximate annual consumption in all trades of white spirit was 50,000 tons, of which 90 per cent. was manufactured in the United Kingdom, but the tax was equally payable on home produced or imported spirit.

The objection to the tax was that it was essentially a tax on raw material, and the actual amount of the tax represented from 40 to 50 per cent. of the cost of the white spirit. Moreover, white spirit could not be replaced by any other untaxed mineral oil for paint and varnish manufacture and was unsuitable as a substitute for motor spirit. Germany, one of our chief competitors, allowed her manufacturers to buy their spirit duty free, and it was also interesting to note that that was also done in the Isle of Man on the understanding that it was not mixed with petrol. In the case of a large proportion of the paint and varnish trade the duty could not be passed on to the consumer because the extra charge in the case of 1 lb. or 7 lb. tins of paint—of which there were many thousands made every year—would be too small. Moreover, there was no organisation in the paint and varnish trade which controlled prices. The Federation was debarred from doing this by its constitution and therefore, although in the individual case the duty was small, yet in the aggregate it was a considerable sum and had to be borne, in the main, by the industry. If any attempt were made to pass it on to the consumer in the case of small quantities of paint it would have to be by a charge higher than the duty and he took it the Government would not wish the industry to make a profit out of the duty in that way.

The Case of Turpentine

Much the same arguments applied to the tax which was also applied to vegetable turpentine, although there were special circumstances in connection with that. When the tax was first applied they were told by Mr. Churchill that it would be necessary for it to be placed on vegetable turpentine to prevent evasion of the tax on petrol, but there was the great difference that turpentine is quite unsuitable for use in an internal combustion engine. The average imports of turpentine in 1926, 1927 and 1928 were 23,058 tons and the value was £1,083,538, the tax at 4d. per gallon amounting to £86,583. This was a relatively small amount from the point of view of the Government, but it was a heavy addition to the cost of manufacture in those trades using turpentine. At the same time, by imposing the tax the Government lost something by way of income tax as the cost of the tax went on to the cost of manufacture. The tax on turpentine, as in the case of white spirit, was a tax on an essential raw material. Turpentine imports had dropped from 579,383 cwt.s in 1927 to 442,896 cwt.s in 1929 and the exports had decreased from 65,299 cwt.s in 1927 to 25,662 cwt.s in 1929, and this had taken place since the tax was put on. There was reason to know that it was definitely due to the tax and, although it was possible to secure the return of the tax in the case of re-exports, in many cases the amount was too small to justify the considerable clerical work and expense and trouble involved in so doing.

When the trade interviewed Mr. Churchill upon the matter, he was disposed to consider favourably the case made with regard to turpentine, and the only argument brought forward by the late Government against the removal of the tax on turpentine was that it was a competitor of white spirit and

that if one material was taxed its competitors must also be taxed. But the principle was laid down by a special Government Commission in 1906 that alcohol should be free of taxation for manufacturing purposes and surely if it were possible to tax white spirit without taxing alcohol it should also be possible to tax white spirit without taxing turpentine, for each was a competitor of the other. At the same time it was not suggested that white spirit should be taxed and that turpentine should not be. The trade asked that the tax should be removed from both. Nevertheless, owing to the difference in price between turpentine and white spirit—the former being very much higher—even if white spirit were taxed and turpentine were not, there would still be such a discrepancy in price that not a single gallon more of turpentine would be used to the prejudice of the sale of white spirit.

New Burdens for Old

In discussing this matter, Mr. Churchill pointed out to the trade that although they were being asked to pay this tax of 4d. per gallon, they were obtaining considerable benefits under the de-rating proposals of the late Government, but the answer to that was the de-rating proposals were specially intended for the relief of industry and were not to be offset by the imposition of other burdens. At the same time, inquiries since then had shown that the tax paid by the members of his Federation in respect of white spirit and turpentine averaged about four times the relief they had obtained in rates. It had also been said that the paint and varnish industry is a highly prosperous one and could afford to pay the tax, but the answer in that case was that whilst certain large firms were making profits the large bulk of the firms were not. The fact that one or two large groups were making profits was published and gave the impression that the whole industry was prosperous. Moreover, it was known that the profits made by the larger firms were mostly from their foreign works and not from their British works. The real point was that the bulk of the trade was being done at very cut prices and a very small percentage was sufficient to upset the balance. Paint and varnish manufacture, continued Mr. Thornley, has been built up in this country on the tradition of quality of raw materials, which was due to the ability to buy in a free market. In that way it had been possible to set up a high standard of quality for British products all over the world, but America and other countries were making great headway and competition was now very keen and in these conditions it was regrettable that anything should be done which would handicap British firms. The industry much preferred to have any taxation take the form of a tax on profits and not a tax levied on costs of production.

Mr. D. Fitte (Boot and Floor Polish Manufacturers' Association) said that in the case of his industry the average benefit from de-rating was 7s. 5d. as against every £1 paid in white spirit and turpentine tax.

Added to Cost of Production

Mr. O. Gunnell (National Federation of Dyers and Cleaners) said that when some years ago a tax was put on petrol, which was largely used by dyers and cleaners, arrangements were made by the Government of the day so that dyers and cleaners obtained their petrol free of duty. The same thing now applied to industrial alcohol, so that the difficulties now spoken of in administering the tax on white spirit and turpentine had already been overcome. The experience in the dyeing and cleaning trade was also that the tax had added to the cost of production and had prevented price reductions.

Mr. G. Sanders, representing the workers' side of the paint and varnish industry, Joint Industrial Council, said that before the imposition of the petrol tax unemployment in the industry was 4 per cent. To-day it was 6 per cent. The workers in the industry had been agitating for improved conditions and a better standard of living, but they had been shown figures which demonstrated to them that this was

impossible in present conditions and the tax on white spirit and turpentine had aggravated the difficulty.

Mr. F. Ayton, on behalf of the British Engineers Association, said that in the case of the large engineering firms who used considerable quantities of white spirit and turpentine for mixing their own paints and also for cleaning machinery before the painting operations, the tax was passed on and it added to the handicap in competing in the world's markets, having regard to the fact, also, that we in this country could not command labour at such cheap rates as our Continental competitors.

Mr. Harding said inquiries had shown that in the case of the paint and varnish industries, only about 10 per cent. of the duty could be passed on to the consumer.

A Strong Case

The chairman, at the close of the discussion, thanked the various associations for the clear way in which they had stated what he thought was a strong case for the removal of the duty on white spirit and turpentine. He suggested that an account of what had taken place should be circulated to all members of Parliament and added that he was not disclosing a secret when he said that an amendment on non-party lines would be introduced into Parliament in connection with the Finance Bill and that a discussion would take place upon the matter in which a detailed statement of the case that had been put forward would be made.

The associations represented and their delegates present were:—National Federation of Associated Paint, Colour and Varnish Manufacturers: Messrs. A. H. Davis, H. W. Harding, S. K. Thornley, Dr. L. A. Jordan, Dr. H. H. Morgan, and J. B. Graham (secretary); White Spirit Association: Messrs. D. Norris and C. S. Jonas (secretary); Boot and Floor Polish Manufacturers' Association: Messrs. D. Fitte, J. McLaren, Felton and H. Kay (secretary); National Federation of Dyers and Cleaners: Mr. O. Gunnell; The Wallpaper Manufacturers, Ltd.: Messrs. J. E. Entwistle and A. Yates; British Engineers Association: Mr. F. Ayton; Federation of British Industries: Mr. Binden-Scott; National Joint Industrial Council for Paint and Varnish Industry: Mr. G. Sanders (representing employees).

Steatite and Porcelain Products

The Opening Ceremony

OVER 300 guests, who travelled by special train from London and included several German and American scientists, attended the inauguration at Stourport, Worcs., on Thursday, May 15, of the new electrical research laboratory of Steatite and Porcelain Products, Ltd. Details and photographs of the new works and laboratory appeared in THE CHEMICAL AGE last week.

Lord Melchett, who was to have performed the opening ceremony, was unable to be present owing to his having to take part in the debate in the House of Lords on the Coal Mines Bill. In his absence, Dr. G. Clayton, of Imperial Chemical Industries, received the guests and presided at a luncheon at the works.

In a letter apologising for his inability to be present, Mr. Baldwin paid a tribute to Lord Melchett, who, he said, had brought a new industry to this country. He wished the industry every success, and said that if anything could assure that success it was its association with Imperial Chemical Industries.

Sir Edward Crowe, of the Department of Overseas Trade, proposing the toast of the electrical industry, said it was one of the new prosperous industries in the country and but for earlier restrictive legislation would have made far greater strides. Thanks to the Central Electricity Board they were now on the way to making very great advances. It was only by the greater utilisation of electrical power that we could progress in all our industries.

Responding to the toast of the Chairman, Dr. Clayton read a speech which Lord Melchett had intended to deliver. In it Lord Melchett said he felt very strongly that the porcelain industry in this country had arrived at such a stage that its rationalisation would produce the maximum of advantage to all concerned, and that the present was a favourable moment to bring about rationalisation. He hoped that the works opened that day would eventually lead to a unified porcelain industry in this country.

I.C.I. and Dissident Shareholders

Compulsory Acquisition Orders

In the Chancery Division of the High Court on Tuesday, Mr. Justice Maugham had before him a petition by Imperial Chemical Industries, Ltd., for leave to acquire compulsorily the holding of 46 shareholders in the British Dyestuffs Corporation, who refused the offer made for shares on the formation of the Imperial Co. in December 1926.

Mr. Lionel Cohen, K.C., for Imperial Chemical Industries, Co., said that the original offer made was of 16 preference shares, 16 ordinary shares and one deferred share in the Imperial Co. in exchange for every 40 shares in the British Dyestuffs Corporation. That offer was based on the market value of British Dyestuff shares at the time.

Mr. Spens, K.C., for Mr. Walter Horridge, a dissident shareholder, said that since the petition had been filed a notice was issued on the authority of the Court to the dissenting shareholders re-offering them shares which they had refused in 1926. Subsequently they were served with a notice having no authority whatever from the Court, intimating that the offer now was only 10s. per share in cash. His client held 3,333 shares, which was practically half the dissentient shares.

Mr. Cohen said that the value of British Dyestuffs shares in 1926 was different from their value to-day, and his clients were satisfied that 10s. per share was a generous offer.

Mr. Spens said he valued his shares at £1 2s. 1d. per share, but he was willing to take shares on the original basis.

Mr. Cohen said he would agree to that, but there being other dissident shareholders who were not before the Court, he had to satisfy his lordship that the offer now made was a fair one.

His lordship said as nine-tenths of the shareholders had accepted the offer made in 1926 he might take it that it was a fair and reasonable one. He was abundantly satisfied that it was more beneficial now than it was then and he gave I.C.I. leave to give notice to the dissentient shareholders to acquire their shares on the basis of the 1926 offer.

Welsbach Light Co., Ltd.

Mr. Justice Maugham also heard a petition by Imperial Chemical Industries for leave to give notice to the dissentient shareholders of the Welsbach Light Co., Ltd., to acquire compulsorily their shares. Nobody appeared in opposition.

Mr. Lionel Cohen, K.C., for the petitioners, said that the matter affected 1,131 shares held by 184 persons, 100 of whom could not be found. The offer made was ten ordinary shares and one deferred share in Imperial Chemical Industries for every 20 shares in the Welsbach Co., who were gas mantle manufacturers. Ninety per cent. of the shareholders had accepted the offer.

His lordship held that the offer was a fair and reasonable one and granted the petition.

Commonwealth Fund Fellowship Awards

The Committee of Award for the Commonwealth Fund Fellowships have made the following appointments to Fellowships tenable by British graduates in American Universities for the two years beginning September, 1930. These Fellowships are offered by the Commonwealth Fund of New York, of which Mr. Edward S. Harkness is president:—

Miss I. G. M. Campbell, B.Sc., of the University of St. Andrews, to Cornell University, in organic chemistry; Mr. Alfred G. Emslie, M.A., of the University of Aberdeen, to Cornell University, in physics; Mr. Douglas W. Hill, B.Sc., Ph.D., of the University of Bristol and the University of Liverpool, to the University of Illinois, in biochemistry; Mr. F. L. Hudson, M.Sc., of the University of Manchester, to the University of California, in physical chemistry; Mr. R. W. B. Pearse, B.Sc., Ph.D., of the University of London, Imperial College of Science and Technology, to the California Institute of Technology, in physics; Mr. R. W. Revans, B.S., of the University of London University College and Emmanuel College, Cambridge, to the University of Michigan, in physics; Mr. William Wild, B.Sc., of the University of Leeds, to the University of California, in physical chemistry.

Among those appointed to Fellowships tenable by candidates from the British Dominions is Mr. Noel S. Bayliss, B.Sc., B.A., of the University of Melbourne and of Lincoln College, Oxford, appointed to the University of California, in chemistry.

Unemployment and Work

By Sir Ernest J. P. Benn

Some much-used phrases in connection with the problem of unemployment are critically examined by Sir Ernest Benn in this, the fourth article of his series. Previous articles were published in THE CHEMICAL AGE of May 3, 10 and 17, and the fifth, on "Official Unassistance," will appear in our next issue.

IV.—Work or Maintenance

THE continual repetition of the Socialist slogan, "Work or Maintenance," has achieved its object upon an intellectually lazy world, and it is to be feared that the fallacy which it embodies is very generally accepted as truth. The notion is that the Government should arrange matters in such a way as to provide work, and failing that, maintenance, from which theory arises, quite logically, the absurd idea that the individual citizen has a claim on the Government in these respects. He is willing to work, the Government (or so the argument runs) is responsible for the absence of work, and that being so, maintenance becomes a citizen's right.

Two big mistakes are apparent in this way of looking at things. First of all, it attributes powers to Government which that institution can never possess; and, secondly, it assigns to the citizen economic rights which in the very nature of things do not exist. The confusion of thought, now quite common, has developed in a very natural way. We began by claiming political rights, things which very definitely do exist. Political rights developed political power. We then began to think, quite wrongly, that political power could be used to provide economic benefit, and from that point the step to economic "rights" became easy and fatal.

"The Right to Live"

The phrase "economic equality" has, when examined carefully, about as much meaning in it as there would be if we spoke of "musical equality," "literary equality" or "moral equality." If it has any basis at all, I am entitled to complain because I cannot secure as many readers for my writings as Mr. Bernard Shaw. A potato might just as well complain because it was planted in poor soil while its fellow could fructify in a better field, and demand that the Government should make all soil equally good for all potatoes. The right to live sounds so nice, appears to be so just, fits in so exactly with the social sentiment of our day, that the phrase slips into our conversation and evades critical thought or examination. But where does it come from—this right to live? What exactly does it mean? Who confers it upon us? What does it consist of? If we think it out, we may find that, like other paradoxical attributes of a civilised life, it exists only on condition that very little use is made of it. The wealth of London built on the gold standard gives us a clue to the truth of the matter. For centuries London has enjoyed pre-eminence in the money markets of the world because London always pays in gold. On further examination, however, we find the truth to be that people prefer to send gold to London rather than fetch it away. The Post Office Savings Bank is a simple illustration. People who put their savings into that safe keeping do so because they are assured of immediate payment when the savings are required. But if even a moderate proportion of the depositors asked for their money on any given day, the bank would burst. It will be observed that the security of the bank depositor, nebulous as it is, depends upon an introductory deposit having been made at some prior date. If such a security, based on initial sacrifice, is only available with such drastic limitations, how can it be argued that "the right to live," a far more comprehensive and expensive security, is freely available for all at all times. The thing is quite absurd, and those who endeavour to ease the hardships of people in trouble with any such dangerous dope are rendering them no service and undermining the stability of society itself.

Prosperity the First Condition

Life is a struggle for existence against the forces of nature, and it is on that firm basis of truth that we must start any discussion which hopes to be useful on how to manage life, so as to secure the maximum of comfort to all. The "right to live" is a soft, comforting, easy lie, the constant repetition of which will lead us further and further into difficulties. As a civilised people we can use our political power to say that when we are prosperous we will devote some of that prosperity

to the care of the down and out, but such an attitude is necessarily governed by serious practical limitations.

It will be noted that our ability to care for the down and out depends entirely upon our prosperity. That prosperity must not be thrown away in the supposed interests of our social failures, for in that way we merely defeat our own charitable purpose. The first condition of our power to aid is that we should be prosperous, and proper attention to our own prosperity may prove to be a better service to the objects of our anxiety than direct attention to their particular needs.

There is another and more practical way of analysing this supposed "right to live." We are concerned, of course, only with the economic side of things, the provision of those material amenities which go to make a decent life according to modern standards. From this point of view, and taking only very simple illustrations, the absurdity of the proposition is apparent. For instance, does "the right to live" include a cup of tea? If so, how do you get it from China? Does the Chinaman recognise your right to live? Is he also possessed of any similar right and who confers it upon him? Has he some prescriptive claim upon English textiles, and are we prepared to honour that claim? Such questions have only to be asked for the inherent absurdity of this "rights" idea to be completely exposed. Is a pipe of tobacco included in this much-talked-of right to live? If so, does it go as far as to give to the smoker the right to a choice of brand or flavour? Can he, if he prefers, select a cigarette instead of a pipe? Has the possessor of the right to live the privilege of reading Edgar Wallace or Arnold Bennett, and have these people any rights, and if so, what are they? Would these self-same rights include the right to a wife? And how shall we arrange matters in such a way as to square the account between the man who gets a wife who knows how to keep a home, and the other man who is not so fortunate? These are practical questions which ordinarily form no part of political speeches; in the sophisticated complications of present-day discussions they seem to be trivial, but surely they serve to bring us back to realities and enable us to realise that you cannot provide the living of the people by Acts of Parliament.

Economic Responsibilities

We can only live by rendering service one to the other. Further, that service must be valued by the person to whom it is rendered. When we get back to fundamental truths like this, we shall begin to march along the road to prosperity, but beforehand we have to retrace a good many false steps. Those steps have mostly been taken in obedience to the erroneous idea of economic rights, forgetting that none of us have anything but economic responsibilities. We can, of course, acquire rights by a full recognition of our responsibilities, but these things must be placed in their proper relation to one another in the same inevitable way that the horse must be in front of the cart if the journey is to be accomplished.

Reflections such as these will, I am fully and painfully aware, bring little or no comfort to the reader who is an unfortunate victim of all our political mistakes and finds himself to-day in difficulties about to-morrow's dinner. I do not, of course, pretend to be discussing what practical steps should or should not be taken to bring momentary aid to such a case. But even the unemployed will agree as to the importance of right thinking and sound principles, and when they consider the disastrous failure of our efforts in recent years to remove the causes of their troubles, they themselves may begin to see that those who have talked to them about the right to live may, after all, be false leaders.

We all possess an inherent sense of the wonderful complications of life and living which makes us doubt the wisdom or the practicability of simple political remedies. In our better moments we experience a sense of revolt against the idea that other people can arrange things for us better than we can manage them ourselves. In particular, we resent the notion inherent in the political method that our troubles are always somebody else's fault. Temporary intellectual comfort secured

that way always proves to be of the nature of the physical comfort obtainable through the use of alcoholic liquor. Both in the end are equally degrading.

Rights and freedom are not capable of bestowal at the hands of either demagogues or soothsayers. They are to be acquired only by those who will pay the price of them, and they are wonderful value, even for the heavy price involved. They are not the simple, stupid things that they are represented to be, but possess that paradoxical truth and charm underlying the old phrase, contradictory in its very words: "Whose service is perfect freedom."

Industrial Pulverised Fuel Firing

Some Important British Installations

ONE of the greatest advances in steam and power practice is "Lopulco" pulverised fuel firing, which originated in 1920 and was first adopted in Great Britain in 1924. In many establishments, including chemical works, water tube boilers, high steam pressures, and generating of electricity by "pass-out" turbines, are now regularly employed, and at the present time the following industrial boiler plants with "Lopulco" pulverised fuel firing are operating or in course of erection in Great Britain.

Stewarts and Lloyds, Ltd. (Coatbridge), York Spinning Co., Ltd. (Belfast), Synthetic Ammonia and Nitrates, Ltd. (Billingham, three separate contracts), Ashington Coal Co., Ltd. (Durham), Pilkington Bros., Ltd. (St. Helens), Shell Mex, Ltd. (Shellhaven, Essex), Metropolitan Carriage and Wagon Finance Co., Ltd. (Birmingham), Taylor Bros., Ltd. (Manchester), and the Bolsover Colliery Co., Ltd. (Yorkshire).

Certainly from the chemical point of view, the most remarkable plant is that of Synthetic Ammonia and Nitrates, Ltd., being eight very large forged drum "Lopulco" boilers of 269,000 lbs. normal evaporation per hour, operating at 800 lbs. per square inch pressure, which represents the third pulverised fuel installation at this works. The International Combustion, Ltd., since 1924 have also equipped 14 British power stations with pulverised fuel firing, that is Brimsdown (London), Nechells and Hams Hall (Birmingham), Derby, Willesden (London), St. Pancras (London), Poplar (London), Walsall, Kirkstall (Leeds), Leicester, Neasden (London), Barking (London), Brighton and Scarborough. Further, they installed "Lopulco" pulverised fuel firing equipment (from England) on a number of power stations abroad, such as Congella (Durban), Buenos Aires (Argentine), Shanghai, Parak Hydro-electric (Malay States), Rosario (Argentine), and The Hague (Holland).

For large and medium-sized industrial installations, especially when using a large amount of process and "boiling" steam, the ideal practice is high pressure water tube boilers and pass-out steam turbines, generating electricity and providing all the necessary low pressure steam from the turbines, thus avoiding the latent heat of steam loss. The latest principles of "Lopulco" pulverised fuel firing include the new "R" turbulent short flame burner, fixed horizontally at the front of the setting, smaller combustion chambers, air heating, hot air passed through the "Raymond" centrifugal pulverisers, and all the air for combustion going into the burners only, water screen, and two side walls and back of "Murray-Usco" steel fin-tube water cooled walls in series with the boiler. Under these conditions 88-90 per cent. steam generation efficiency is obtained in actual continuous running all the year round, with, of course, absolutely smokeless combustion, and 93-94 per cent. on 12 hours trials, although 55-60 per cent. is about the present average industrial steam generation efficiency.

Harris Balances

A wide range of balances is now manufactured by J. W. Harris, of 53, Deansfield Road, London, S.E.9, both in standard patterns and designed for special requirements. The No. 2 balance has a six inch gunmetal beam to carry 500 grams in each pan and turn with 0.1 milligram, and is constructed with agate knife edges working on agate planes. Other cheaper standard models are designed for lesser weights and to turn with 0.5 or 0.1 milligram. The firm makes a speciality of repairing balances, whatever their conditions, and refinishing in lacquer, gilt, chromium plating, silver and nickel.

New University Laboratories at Cardiff

Opening by Prince of Wales

THE Prince of Wales, on Wednesday, opened the new Tatem Physics and Chemistry laboratories at the University College of South Wales and Monmouthshire, which have been built largely owing to the generosity of Lord Glanely.

Replying to an address of welcome, the Prince, who made the journey to Cardiff by air, said that nine years ago, when he was installed as Chancellor of the University of Wales, he drew attention to the need for scientific laboratories. The possession of adequate laboratories, he continued, is an asset of the highest importance in these days, and enriched and strengthened by these new buildings, the University of South Wales will henceforth play even a more important part in the life of the Principality. At one time it was generally considered that the chief object of university training was the preparation of students for academic careers, but nowadays the importance of the relation between science and industry is more clearly realized, and we know how valuable a contribution scientific training makes to our commercial and industrial welfare. Close co-operation between leaders in academic life and the controllers of great business concerns is in the best interests of the country, and from its universities in future will go forth not only the teachers of the generations to come but also—and this is just as essential—young men well equipped by their training to maintain our vital supremacy in commerce and industry. The Prince then referred to the new advisory department of agriculture, and said that it would be a valuable addition to the college. Those who farmed the land had severe competition from abroad, and many other difficulties to overcome, and it was only with the assistance of the best available scientific resources that they would be able to surmount them.

Lord Glanely, who announced yet a further gift of £20,000 to allow the laboratories to be opened free of debt, said in the commercial world, as in other spheres of life, they wrestled with principalities and powers. For instance, there was a battle being fought out between coal and oil, in the process of which vast sums were spent on the one side in an effort to oust the other. Laboratories were the trenches in that battle. It was in the "lab.", by research and experiment, that ideas were germinated long before they became material for the imports and exports of nations. It was in the "lab." that places like Rio de Janeiro were made fit for commerce, and that many of the problems of man were mastered.

Second World Power Conference

Great Britain's Delegates

THE British national committee of the World Power Conference, which has been responsible for the submission of no less than 50 scientific papers to the Berlin plenary meeting in June next, recently informed the Organising Bureau in Berlin concerning their official delegates to the Second World Power Conference. These are Mr. Ll. B. Atkinson (Cable Makers' Association); Dr. A. E. Dunstan (Institution of Petroleum Technologists); Dr. C. H. Lander, C.B.E. (Department of Scientific and Industrial Research); Sir Benjamin Longbottom (British Electrical and Allied Manufacturers' Association); Mr. A. Nichols Moore (Incorporated Municipal Electrical Association); Sir Archibald Page (Central Electricity Board); Mr. W. H. Patchell (Institution of Mechanical Engineers); Mr. Roger T. Smith as special member, and Sir David Milne Watson (National Gas Council of Great Britain and Ireland).

Other public men who will take part in the Berlin plenary meeting include Mr. D. N. Dunlop, chairman of the International Executive Council of the World Power Conference, under whose auspices the first plenary meeting took place at London in 1924, the Hon. Sir Charles A. Parsons, O.M., K.B.E., F.R.S., British Vice-President of the World Power Conference; Sir Richard Threlfall, F.R.S., Chairman, Fuel Research Board; Sir Andrew Duncan, Chairman, Central Electricity Board; Mr. W. W. Lackie, Electricity Commissioner; Professor Douglas Hay; Mr. James Kewley, Asiatic Petroleum Company; and Professor A. S. Eddington, F.R.S., Professor of Astronomy at Cambridge University, who will deliver an important public address at the Second World Power Conference on "Subatomic Energy."

Induction Furnaces for Laboratories

A Metrovick Development

In addition to the larger coreless induction furnaces of improved design developed by the Metropolitan-Vickers Electrical Co. for melting iron and steel and non-ferrous metals in commercial service, this company has also produced small induction furnace equipments which are particularly suited to laboratory work. The latter development was carried out originally to meet the needs of the company's own research work, but the design was later commercialised, and equipments supplied to the Universities of Manchester and Sheffield have been in successful operation for some time. An equipment of similar type but of somewhat larger size has now been ordered by Imperial Chemical Industries, Ltd., for use in the research



METROVICK INDUCTION FURNACE AT MANCHESTER UNIVERSITY.

laboratories of the works of Brunner Mond and Co. at Winsford, near Northwich.

The furnaces of this type have been developed in a range of sizes. The equipment ordered by Imperial Chemical Industries, Ltd., is designed to melt a charge of 20 lb. of metal and is rated at 20 kW. The equipment supplied to the University of Manchester is designed for a charge of $\frac{1}{2}$ to 2 lb. and is rated at 5 kW. Two equipments at Sheffield University are of rather smaller size and are used for melting charges of a few hundred grams of metal in vacuo. In all cases the supply of power at high frequency for operating the furnace is obtained by means of a water-cooled oscillator valve. The development has thus an additional interest as an example of the use of thermionic valves for industrial work.

The use of an oscillator valve which gives a frequency of about 500,000 cycles enables the furnaces to melt very small charges. While it is possible to melt a $\frac{1}{2}$ ton charge of steel with power at 500 cycles, charges of a few grams require very much higher frequency. In laboratory furnaces, especially when working with rare or costly metals, it is very desirable to be independent of any size restrictions imposed by purely electrical considerations, and so it is essential to provide a frequency which will melt all charges from a few grams up to several pounds.

The furnaces will melt charges of up to $\frac{1}{2}$ lb. in two to three minutes. The normal full charge is melted in 20 to 30 minutes. All the furnaces will melt quantities up to about twice their

normal charge provided that a correspondingly longer time is allowed for the operation. The only limit to the temperature attained in small charges is that imposed by the melting point of the refractory container and within this restriction any metals can be melted. So great is the rate of energy input that a $\frac{1}{2}$ lb. charge of steel will actually evaporate if left in the furnace field for five minutes. The power consumption on the larger charges of steel is only about 0.5 kW. hr. per lb. of charge and correspondingly less for metals of lower melting point.

Our illustration shows the furnace equipment installed at Manchester University, the furnace proper consisting of a water-cooled coil within which is placed a crucible containing the metal to be melted. The coil is seen on the table. The incidental equipment shown consists of a high frequency valve oscillator set and a three-phase valve rectifier set, together with control gear, indicating instruments and protective devices.

Institute of Chemistry

April Examination Results

THE following have obtained passes in the April examinations of the Institute of Chemistry:

Examination in General Chemistry for the Associateship: Harold Adams, A.M.C.T. (College of Technology, Manchester); Frederick William Allen, A.M.C.T. (College of Technology, Manchester); Dennis Clifford Beese (Sir John Cass Technical Institute, London); Frederick William Bush, B.Sc. (Lond.) (Battersea Polytechnic, London); Archibald Henry Churchouse, B.Sc. (Lond.); Robert Craig Crawford (Royal Technical College, Glasgow); Ivor Dembrey, B.Sc. (Bris.) (The University, Bristol); Joseph Fenner (Central Technical School, Liverpool); Ernest Edward Hale (West Ham Municipal College, London); James Dillwyn Joseph, A.M.C.T. (College of Technology, Manchester); John Robert Maddocks, A.M.C.T. (College of Technology, Manchester); John Nicholson, B.Sc. (Lond.) (West Ham Municipal College, London); Arthur Ernest Owen, B.Sc. (Lond.) (Central Technical School, Liverpool); Alfred Pass (Technical College, Birmingham); and Sir John Cass Technical Institute, London); William Caird Peek (Royal Technical College, Glasgow); Ernest Emerson Rawlings, B.Sc. (Lond.) (Municipal Technical College, Hull); Edwin Hemus Steer, B.Sc. (Lond.) (Technical College, Birmingham); Richard Spenser Thomas (The University, Manchester; and Technical College, Birmingham); James Westhead, A.M.C.T. (College of Technology, Manchester); Alfred Leonard Wilks, B.Sc. (Lond.).

Examination for the Fellowship: In Branch C: Organic Chemistry: George Harding; Eric Reid; Dudley Herbert Smith, M.Sc. (Lond.), A.R.C.S., D.I.C. In Branch E: The Chemistry, including Microscopy, of Food and Drugs, and of Water: Leonard Balmforth, B.Sc. (Lond.); Reginald Henry Coysh, M.Sc. (Bris.); Charles Arthur Hallas, B.Sc. (Lond.); Magnus Herd, B.Sc. (Glas.), A.R.T.C.; Archibald Robert Jamieson, B.Sc. (Glas.); Walter George Messinger, B.Sc. (Birm.); James William Roche, B.Sc. (Bris.); Horace Samuel Rooke, M.Sc. (Birm.); Samuel Gordon Stevenson, B.Sc., B.Pharm. (Lond.); Sydney Norman Herbert Stothart, Ph.D. (Liv.). In Branch G: Industrial Chemistry: James Horst Brunneman Bell, M.A., B.Sc. (Edin.); Frank Leonard Bingham Revis, A.C.G.F.C.

Alleged Fraud by Wholesale Chemists

PERCY LISSEN WAIN, of Chaplain Road, Longton, Staffs, a director of Wain Brothers (Limited), wholesale chemists, Normacot Road, Longton; William Thomas Davies, of South Promenade, St. Annes-on-Sea; and Louis Foschi, of Howard Drive, Grassendale, Liverpool, were, at Stoke-on-Trent, on Thursday, May 15, committed for trial on a charge of conspiracy to defraud the Inland Revenue in relation to the income tax returns of the business of Wain Brothers. There were a number of charges, including alleged forgery of invoices and receipts. The total of the irregularities was stated to be £17,939, with an approximate loss to the revenue of £10,000.

It was alleged that, in order to reduce the disclosed taxable profits of the firm, fictitious purchases were shown, and that Davies and Foschi supplied invoices and receipts purporting to be in respect of purchases by Wain Brothers. Pleas of not guilty were entered by all three men, who reserved their defence.

From Week to Week

FATAL INDUSTRIAL ACCIDENTS in Great Britain and Northern Ireland during the month of April numbered 175, two being in chemical works.

AT THE INTERNATIONAL CONFERENCE of the Chemical Textile Dyes Industry in Milan, proposals were adopted for the formation of an international federation of dyes merchants with headquarters at Bale. The final statutes of the Federation will be drawn up at the 1931 conference which is to be held in Paris.

THE WILLARD GIBBS MEDAL of the Chicago Section of the American Chemical Society, awarded annually for work in either pure or applied chemistry which has received worldwide recognition, was presented to Dr. Irving Langmuir in Chicago on Friday. His address on the occasion was "What are Atoms Like. . . How Do We Know?"

WILD-BARFIELD ELECTRIC FURNACES, LTD., announce that owing to the expansion of their business, their licensees for France, Switzerland, and the Netherlands, La Compagnie Française "Wild-Barfield," have recently taken new premises at 110, Avenue du General Michel Bizot, Paris. A full range of Wild-Barfield electric furnaces will be manufactured and sold from these works.

THE PRESIDENT of the Board of Trade has appointed Alderman E. B. Lewis, President of the National Chamber of Trade, as an additional member of the committee recently set up under the chairmanship of Lord Chelmsford, to examine the present situation as regards the British Industries Fair, and to consider what means can be adopted to increase still further its utility to British trade.

A START has been made with the new by-product coking plant of John Brown and Co. at Canklow, South Yorkshire. It includes 28 ovens and when in full operation will have a carbonising capacity of approximately 3,000 tons of coal a week, as compared with 2,000 tons a week of the old plant. With a 50 per cent. increased capacity it will need only 50 men in place of the 120 required for the old plant.

SIR RICHARD THRELFALL, F.R.S., is seriously ill at his home, Church Road, Edgbaston, Birmingham. Formerly Professor of Physics at Sydney University, Sir Richard is technical director with the chemical firm of Albright and Wilson, of Oldbury, and during the war achieved distinction for his work in connection with naval and military smoke screens, the use of helium in airships, and with instruments for detecting the presence of explosive mixtures.

MR. WALTER RUNCIMAN, M.P. proposed the toast of "The Institution" at the annual dinner of the Institution of the Rubber Industry, held at the Criterion Restaurant, London, on Monday night, remarking that one of the greatest paradoxes of to-day was that while we were living in a time of great abundance of commodities, there was never so much depression in the trade and commerce of the world. Professor J. F. Thorpe, president of the Chemical Society, replied to the toast of "Allied Associations."

THE SOCIETY OF GLASS TECHNOLOGY is holding its next meeting jointly with the Deutsche Glastechnische Gesellschaft, a party of whose members will be entertained from Monday, May 26, to Tuesday, June 3. The visiting delegation will be welcomed at Sheffield on May 26 and until June 1 will undertake a programme of works visits and social engagements. Joint meetings of the technical committees of the Societies and the general session for the reading and discussion of papers will follow on June 2 and 3 in London.

THE MANY YEARS of civic work given to London by the late Sir John Benn (the founder of Benn Brothers, Limited, publishers of THE CHEMICAL AGE) will be commemorated next Friday when the "John Benn," a newly built ferry-boat, will make her maiden trip from the South Pontoon, Woolwich. She has been given her name by the London County Council as a tribute to the late Sir John and with the cordial consent of the members of his family. When the new boat makes her maiden trip, there will be present many of the children and grandchildren of Sir John, together with a large party of boys from the John Benn Hostel in Stepney, through which the present baronet, Sir Ernest Benn, has commemorated his father's life and work.

THE LIVERPOOL EXPLOSION at the oil cake mills of J. Bibby and Sons on May 6 has claimed two more victims, bringing the total death roll up to eleven.

THREE MEN, including Mr. Kerr, a chemist, were injured in an explosion at the Triplex Glass Works, at Eccleston, Lancashire, on Wednesday. They were experimenting with a chemical mixture at the time, and were badly scalded.

THREE THOUSAND TELEPHONES, a record number for any single European building, will be installed in Thames House, Westminster, on its completion in 1931. The previous telephone record in this country was held by Imperial Chemical House, which had 2,000.

THE FUEL RESEARCH BOARD has invited all companies engaged in low-temperature carbonisation of coal to send representatives to a conference at the offices of the Board in Westminster on the morning of May 30. Questions involving subsidies, special agreements with the Government, and other political matters, will be strictly outside the scope of the Conference.

SEVERAL CHEMICAL INDUSTRIES are included among the 27 represented on the committee which the Federation of British Industries has set up to consider the possible reactions upon industry of the Consumers' Council Bill now before the House of Commons and the Committee on Restraint of Trade which has been set up by the Lord Chancellor and President of the Board of Trade.

MR. P. W. TAINSH, who has been chief chemist to Lever Brothers, Ltd., since 1914, is to receive the honorary degree of M.Sc. of the University of Liverpool at the annual congregation on July 5 next. Mr. Tainsh received the O.B.E. for his work as Supervisor of Factories for the Ministry of Munitions during the war, and is a member of the council of the Institute of Chemistry.

FIRE BROKE OUT last week at the premises of W. A. Wayland and Co., Ltd., manufacturing chemists, U.K. Works, Blackhorse Road, Deptford, and did considerable damage to a drying machine and a ventilating shaft running from the ground floor to the top floor. Another outbreak was at the works of British Glues and Chemicals, Ltd., 124, Grange Road, Bermondsey, where a small quantity of stock was damaged.

THE GERMAN BUNSEN SOCIETY (Deutsche Bunsen-Gesellschaft), the leading German society in the physico-chemical sphere, is holding its 35th general meeting at Heidelberg, with which town Robert Bunsen was so closely associated, from May 28 to June 1. "Spectroscopy and the formation of Molecules" will be the principal subject under discussion. Names of persons desirous of participating may be sent to the "Ortsausschub der Deutschen Bunsen-Gesellschaft, Heidelberg, Ploeck 55," the local committee, which will find accommodation.

FINES OF £10 EACH, with 25 guineas special costs and 5s. ordinary costs, were imposed on two members of a Dudley firm of bedding manufacturers by the Dudley magistrates on Friday, May 16, for applying a false trade description to a mattress. The mattress in question bore a statement that it had been purified and sterilised according to Government regulations, which demand that there must not be more than thirty parts of chlorine to one hundred thousand parts of flock. The analysis of this particular mattress, it was stated, showed that it contained 230 parts of chlorine to 100,000 parts of flock.

THE MARYHILL (Glasgow) Works of the Cassel Cyanide Company, a subsidiary company of Imperial Chemical Industries, Ltd., have been closed down consequent upon the transfer of manufacture to Billingham, and all suitable workers from Maryhill have been offered alternative employment at Billingham. Removal expenses, including those of the workers themselves, their wives, families and furniture, are being defrayed by Imperial Chemical Industries, Ltd. Those workers with any appreciable length of service with the Cassel Cyanide Company to whom it has been impossible to offer transfers are receiving a monetary gratuity, or, in certain cases, a pension.

Obituary

MR. CHARLES F. MCKENNA, former president of the Chemists' Club, New York, aged 68.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

326,762. TETRA-HYDRONAPHTHOLS AND THEIR DERIVATIVES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 16, 1928.

Naphthol esters of the formula $C_{10}X_7O$ acyl, in which X represents hydrogen or one X represents a monovalent substituent in the same ring as the ester group, are catalytically hydrogenated to obtain ar-tetra-hydronaphthol esters. The catalyst is a base metal, e.g., nickel, and an organic solvent such as tetra or deca-hydronaphthalene may be added. Naphthol ethers of the formula $C_{10}H_{8-n}(O\text{-alkyl})_n$ in which n=1 or 2 are similarly hydrogenated to obtain ar-tetrahydronaphthol ethers. The esters may be saponified to obtain the corresponding ar-tetrahydronaphthol. The products are perfumes and intermediates for the production of dyestuffs and pharmaceutical materials. The hydrogenation may be effected at a temperature of 50°-110° C. and pressure of 20-80 atmospheres. Thus ar-1-hydroxy-tetra-hydronaphthalene acetate or benzoate may be obtained from α-naphthol acetate or benzoate, and ar-1-hydroxy-tetra-hydronaphthalene is obtained by saponification of the product. Several other examples are given.

326,789. SYNTHETIC DRUGS. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 13, 1928.

These compounds are obtained by treating an aromatic arsenic acid containing amino and/or hydroxy groups with aminoalkyl or alkyl-aminoalkyl halides, or with such substitution products as bromethyl-phthalimide with subsequent splitting off of phthalic acid, or the arsenic acids may be treated with ethylene oxide or a halogenated alcohol and the products converted into the halides and then into the amino or alkyl-amino compounds. The arsenic acids may be reduced to the arseno compounds. In an example, arsanilic acid is treated with diethyl-amino-ethyl chloride and the N-diethyl-amino-ethyl-p-amino phenyl arsenic acid reduced to the arseno compound.

326,791. DYES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 17, 1928.

To obtain disazo dyes of the type A→M→X and trisazo dyes of the type A→M→M¹→X in which A represents 1:8-aminonaphthol or a derivative, M and M¹ represent the same or different middle components of the benzene or naphthalene series, and X represents a 1-(N-acyl) amino-8-naphthol or a derivative or a 1-(N-heterocyclic) amino-8-naphthol or a derivative, the final coupling is effected in the presence of pyridine or a derivative. If the acyl or heterocyclic residue of the end component contains a diazotisable amino group, the product may be diazotised and coupled with components or may be treated with acid chlorides or anhydrides such as phosgene, acetic anhydride, or benzoyl chloride, or with heterocyclic compounds containing labile halogen atoms such as chloro-quinazolines, chloro-phthalazines, 2-halogen-benzothiazoles or cyanuryl chloride. The products give fast blue, bluish-green, grey and green shades on vegetable fibres, and in some cases on viscose. A typical example is H-acid→cresidine→1-(4¹-methoxy-benzoyl) amino-8-naphthol-6-sulphonic acid which gives blue shades on cotton and viscose. A large number of other examples are given, with particulars of their dyeings.

326,795. ORGANIC NITROGEN AND SULPHUR COMPOUNDS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 17, 1928.

Mixtures of unsaturated hydrocarbons such as acetylene and ethylene with ammonia are passed over catalysts consisting of solid inorganic sulphur compounds such as pyrites or spent gas purifying material at 250°-600° C. to obtain condensation products including pyridine homologues such as picolines and collidines, nitriles, thiophene, etc. The gases

may contain also inert gases such as methane, carbonmonoxide, hydrogen, nitrogen and steam, and the catalyst may contain as activators metals of the second and/or fourth group or their compounds which are difficultly reducible, or difficultly reducible compounds of the metals of the third to the sixth group. The condensate separates into two layers and the aqueous layer may be used to denature alcohol.

326,812. ALCOHOLS, ALDEHYDES, AND KETONES. E. Neumann, 220, Cromwell Road, Earl's Court, London. Application date, September 18, 1928.

The vapours of lower alcohols or mixtures of these are passed at atmospheric pressure and temperature below 350° C. over a catalyst consisting of a mixture of a hydrogenating or dehydrogenating component with a dehydrating component, to obtain higher alcohols and the corresponding aldehydes and ketones. The catalysts may be silver, copper, cobalt, iron or nickel, mixed with oxide of aluminium, thorium, iron, chromium, tungsten, titanium or beryllium. The aldehydes and ketones with any of the original alcohol may be returned to the process. Examples are given of the production of butyl alcohol from ethyl alcohol, 2-methyl-pentanol-1 from propyl alcohol, methyl-isobutyl-carbinol from iso-propyl alcohol, and methyl-propyl carbinol with methyl-isobutyl-carbinol from a mixture of ethyl alcohol and isopropyl alcohol.

326,814. FERTILISERS. H. W. Hereward, Cartref, Redding, Falkirk, and P. O. Hereward, Jaques, Whyteleafe Road, Caterham, Surrey. From H. Wigglesworth, 18, East 41st Street, New York, U. Orlandi, and G. Levi, 53, Via Adda, Rome. Application date, November 14, 1928.

A mixed fertiliser consisting of sodium ammonium hydrogen phosphate, with other salts such as ammonium chloride, nitrate, or sulphate, is obtained by neutralising with ammonia a phosphoric acid solution or an acid phosphate obtained by treating a natural phosphate with mineral acid, in the presence of sodium chloride, nitrate, sulphate or carbonate. Potassium salts may be added in the form of kainite, sylvine, or carnallite. The details of the process are given.

326,815. SULPHONIC ACIDS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 12, 1928.

Non-aromatic carboxylic acids containing more than 8 carbon atoms or esters with polyvalent alcohols are sulphonated in the presence of an inert diluent, such as carbon tetrachloride, by means of three molecular proportions or less of sulphur trioxide. The products are wetting, cleansing and emulsifying agents.

326,861. CELLULOSE DERIVATIVES. H. Dreyfus, 22, Hanover Square, London. Application date, November 23, 1928.

Cellulosic materials are treated with esters of organic acids, e.g., methyl, ethyl, amyl, and benzyl acetates, m- and p-methylbenzyl acetates, ethyl laurate, diethyl oxalate, diethyl and dimethyl malonates, and succinates, and ethyl ethoxy acetate, in the presence of tertiary organic bases such as dialkyl-anilines or naphthylamines, pyridine and quinoline and their alkyl derivatives, N-alkyl or aryl piperidines, dimethyl-n-hexylamine, and isoamyl diethylamine.

326,869. SYNTHETIC RUBBER. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 20, 1928.

Butadiene or its homologues, including phenyl butadiene, styrol, etc., are polymerised by means of an alkali metal in the presence of a small quantity of ammonia or a free cyclic or saturated aliphatic primary, secondary or tertiary base, so that polymerisation is retarded and undue rise of temperature avoided. Examples are given of the polymerisation of butadiene and isoprene by means of sodium in the presence of small quantities of ammonia and aniline.

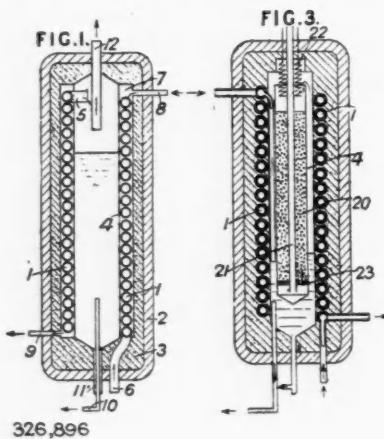
326,874. DYES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 22, 1928.

Alkyl ethers of anthranthrone are treated with a halogen

or halogenating agent in dissolving or suspending media, such as sulphuric acid, chlorsulphonic acid, nitrobenzene, or trichlorbenzene, and in the presence of a catalyst such as iodine, sulphur, metals or their salts, e.g., iron, mercury, manganese, antimony, and their halides. The halogenated alkyl ethers of anthranthrone may be purified by crystallisation from high-boiling solvents, by oxidising agents or by decomposing the sulphate. Examples are given of the treatment of monomethoxy-anthranthrone, monochlor-ethoxy-anthranthrone, and monoethoxyanthranthrone.

326,896. DESTRUCTIVE HYDROGENATION. W. R. Tate, and H. P. Stephenson, Norton Hall, The Green, Norton-on-Tees, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, December 31, 1928.

Liquid or pasty carbonaceous materials, e.g., oil, are mixed with hydrogen and supplied through pipe 6 to a pipe coil 1



in a heating jacket 7 surrounded by lagging 3 and contained in a high-pressure vessel 2. The material is heated by carbon dioxide or nitrogen passed through the jacket 7, preferably at the same pressure as the reaction mixture. The products are discharged into a separating vessel 4, from which gases pass by pipe 12, liquid by pipe 10 to be recirculated, and sludge by pipe 11. In another apparatus, Fig. 3, the liquid passing through spiral 1 is heated by hot gas in a surrounding spiral, and the gases drawn from the separating vessel 4 are passed over an electric heater 22 and then through a catalyst 21 to the outlet 20.

326,913. CARBON BLACK. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 9, 1929.

Carbon compounds are catalytically decomposed by heat in a non-sparking electric field in which no substantial discharge takes place, to obtain carbon black. Acetylene, olefines, diolefines, paraffin, aromatic and hydroaromatic hydrocarbons, carbon monoxide, etc., may be treated, in the presence of catalysts consisting of metals of the iron group or their compounds, the activity of which may be increased by adding oxides, hydroxides or carbonates of sodium, potassium, boron, magnesium, barium, strontium, calcium, cadmium, zinc, aluminium, vanadium, chromium, titanium, thorium, or phosphorus pentoxide. The heating device D is contained within a tube C serving as an electrode and surrounded by a wire cage B containing the catalyst A. The casing G serves also as an electrode. The voltage applied to the electrodes may be 200 volts, the temperature may be 300°–500° C., and the current may be 1 milliampere or less.

326,949. DYES. Imperial Chemical Industries, Ltd., Millbank, London, F. Lodge and W. W. Tatum, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, February 8, 1929.

$1:4$ -Diamino-, and 1-amino-4-arylamino-anthraquinone-2-sulphonic acids are treated with polyhydric aliphatic alcohols in presence of alkali, by which sulphurous acid is split off. The products are hydroxy ethers and are dyes for acetate silk and wool. Examples are given of the condensation of sodium $1:4$ -diaminoanthraquinone-2 : 3-disulphonic acid with gly-

cerol, sodium 1-amino-4-anilino-anthraquinone-2-sulphonic acid with glycerol, 1-amino-4-anilino-anthraquinone-2-sulphonic acid with ethylene glycol, and 1-amino-4-anilino-anthraquinone-2-sulphonic acid with triethanolamine.

326,971. DYE INTERMEDIATES. O. Y. Imray, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, February 26, 1929.

Derivatives of 2 : 3-hydroxynaphthoic acid which are intermediates for dyestuffs are obtained by heating 2 : 6-dihydroxynaphthalene-3-carboxylic acid with ammonia or primary or secondary amines. Examples are given of the condensation with ammonia, methylamine, aniline, halogenated anilines, toluidines, xylidines, anisidines, halogenated anisidines, benzylamine, monomethylaniline.

326,977. NITRIC ACID AND ALKALI BISULPHATE. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, February 28, 1929.

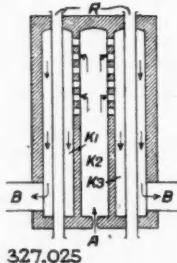
In the reaction of dilute nitric acid on alkali sulphate to obtain alkali nitrate and sulphuric acid, alkali sulphate, or nitrate is subsequently added to form alkali bisulphate, which crystallises out on cooling.

327,007. DYES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 25, 1929.

N-dihydro-1 : 2 : 2¹ : 1¹-anthraquinoneazine obtained as described in specification 184,193 (see THE CHEMICAL AGE, Vol. VII, p. 538) is treated with sulphuric acid monohydrate and anhydrous boric acid, at 70°–130° C., by which a single sulphonic acid group is introduced. Reference has been directed by the Comptroller to specification 240,168.

327,025. CATALYTIC APPARATUS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 15, 1929.

In endothermic reactions the catalyst is heated by radiation from suitable surfaces, which are heated by furnace gases,



electric current, etc., and preferably consist of metals or oxides of the iron group which have a high heat absorption or emissive power. Apparatus for the catalytic conversion of methane and steam into carbon monoxide and hydrogen, or for the decomposition of organic compounds, such as methane, consists of a combustion chamber K2 for heating gases entering at A, which heats the surrounding walls. The hot gases pass through lattice brickwork into outer chambers K1, K3 to the outlets B. The catalyst tubes R are heated partly by the hot gases flowing over them, but mainly by radiation from the hot walls.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention : 303,797 (Naamlooze Vennootschap Electro Zuur-en Waterstoffabriek), relating to highly absorbent cuprene from acetylene, see Vol. XX, p. 259 ; 304,150 (I.G. Farbenindustrie Akt.-Ges.), relating to separation of waxes into their acids and mixtures of their alcohols and hydrocarbons, see Vol. XX, p. 283 ; 304,207 (I.G. Farbenindustrie Akt.-Ges.), relating to artificial rubber, see Vol. XX, p. 283 ; 313,505 (Holzverkohlungs Industrie Akt.-Ges. and J. Varga), relating to destructive hydrogenation of carbonaceous bodies, see Vol. XXI, p. 156.

Specifications Accepted with Date of Application

299,896. Conversion of ammonia into fertilisers. G. F. Uhde. November 3, 1927.

303,375. Products of the anthracene series, Manufacture of Farbenindustrie Akt.-Ges. December 30, 1927.

(Continued at end of Jubilee Supplement).

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Jubilee History

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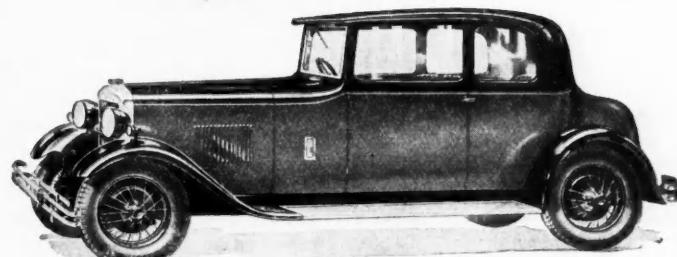
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Each SINGER Model represents the **BEST** that the British motor industry produces. The SINGER "SIX" is a beautiful car with long sweeping lines, and genuine coach-built construction. The engine will maintain a high cruising speed, and give an outstanding top gear performance from 5 to 55 m.p.h. The SUPER-SIX has a seven-bearing crankshaft, one-shot central lubrication to all points of the chassis, four-speed gear-box, and many other exclusive features.

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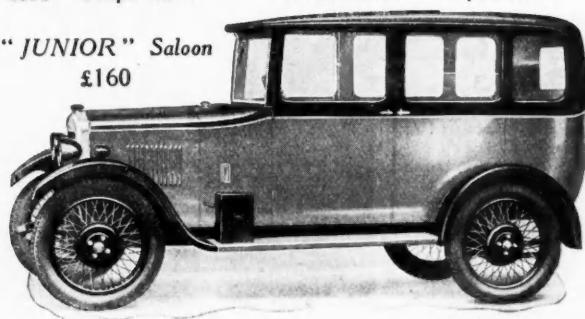


"SIX" Saloon £275
"SUPER-SIX" Saloon £350



"SIX" Coupe £270 "SUPER-SIX" Coupe £350

"JUNIOR" Saloon
£160



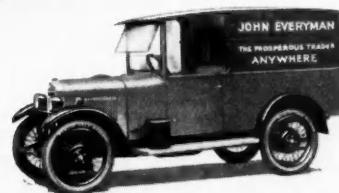
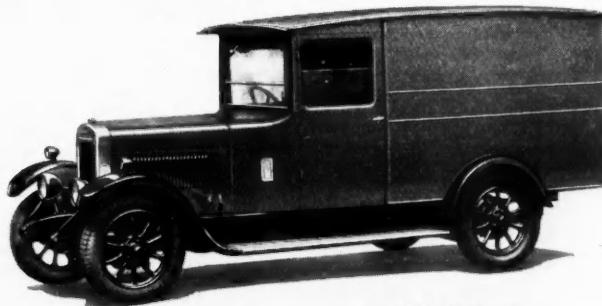
*The **BEST VANS** for your **BUSINESS***

SINGER "SIX" DELIVERY VAN

Gives a real express delivery service with economical running costs. Here are some of its special features:— All-weather cab, winding windows, carrying 14 cwt., petrol consumption 22/24 m.p.g. Speed, fully loaded, 50 m.p.h., smooth 6-cylinder engine, "Marles" patent steering, six brakes on four wheels. Price £200.

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Costs only 1d. per mile to run. It has internal expanding brakes on all four wheels. Carrying capacity 5 cwt. Petrol consumption 35 to 40 m.p.g. Price £135.



Catalogues and full particulars from SINGER & CO. LTD., COVENTRY.

LONDON SHOWROOMS: STRATTON HOUSE, PICCADILLY, W.1

EN

ARTS AND CRAFTS—Commercial.

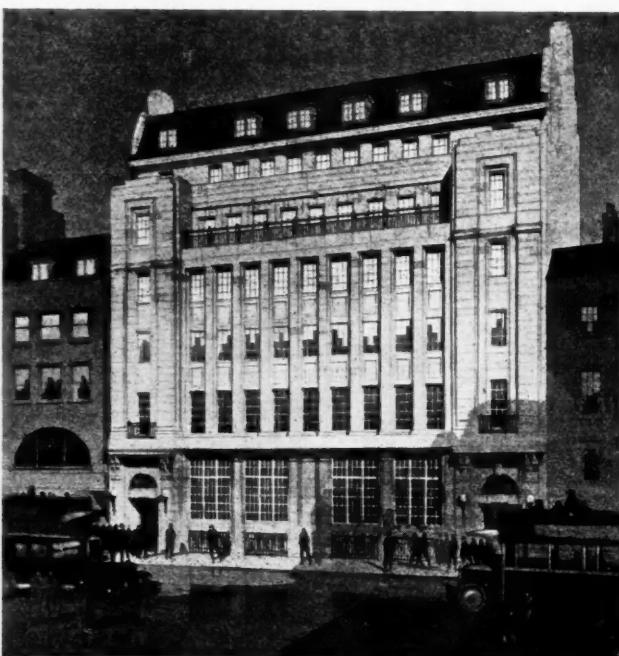
ENGRAVING

on the contrary the fact that this country can claim to be the birthplace of the modern Three Colour Process is entirely due to the farseeing generosity of the ARC ENGRAVING CO. The actual inventor was Harmann Cartheusar, a cosmopolitan craftsman of outstanding genius, and it was due solely to the encouragement and practical assistance of the "ARC" that he was enabled in their Studios and at their expense to conduct his experiments with the new collodion emulsion until Colour Type reached the stage when it became a definite commercial proposition.

Nor was this the first instance of the keen interest taken by the ARC Engraving Company in the technical development of their craft. For as far back as the days of wood engraving when this tedious process failed to keep step with the rapidly increasing demand for good illustration in Books, Periodicals and even the Daily Newspapers, this Company played a pioneer part in the production of "Line" and Half-tone Blocks by the new chemical processes which followed the invention of modern photography. That this traditional enterprise remains to-day as then is evidenced in the important commissions with which this Firm is continually entrusted and reflected in the notable results achieved.

In an article such as this, viewing as it does the development of process engraving from the standpoint of craftsmanship rather than the technical methods it employs, this special reference to the "ARC" Engraving Company is amply justified. For it is generally accepted by prominent users of commercial illustration that an "ARC Block" whether in the simplest "line" or the most intricate "colour work" provides outstanding evidence that above the present day demand for speed and, in many instances, mass production, there remains still adequate scope for that individual treatment and artistic perception without which no genuine craft as such can survive.

It is this very attitude towards their business that has earned and maintains for the "ARC" the premier position in the engraving world which they unquestionably enjoy. Indeed many of the "ARC" Reproductions, especially in Colour are regarded by experts as the finest specimens of modern process engraving in existence. The student and also those who are commercially interested in securing this class of work will need no further evidence on the point than the wonderful coloured plates issued by Messrs. Benn Brothers in their classical series of illustrated Books on Ceramic Pottery. These plates, produced in the "ARC" Studios, deal with the most complicated colour subjects and the superb skill which alone made them possible was deemed



worthy of an appreciative Editorial commentary rarely vouchsafed to commercial enterprise however excellent.

With acknowledgments we quote the following significant paragraph from *The Observer*, December 30th, 1923. "So faithfully do these reproductions render the textures, glazes, and exact tones of the different subjects that the actual handling of the pieces could scarcely be more instructive." Such a tribute from such a source is praise indeed. It is equally significant to note that the production of these plates must in no sense be regarded as an isolated example or as representing a supreme effort to meet a supreme occasion. They were produced upon a strictly commercial basis and the fact that their cost was no more and no less than that often paid for work of a less satisfying nature is not only worthy of record but of immense practical importance to all who require such aid in the preparation of their Business Literature.

The "ARC" Colour Studios at Wimbledon (the offices of the Company are at 4 and 6, Farringdon Avenue, E.C.4) are equipped with every appliance required for modern colour reproduction, and these advantages coupled with the selective care exercised in the appointment of their Operatives enables the "ARC Engraving" to extend to the smallest commission the same skilful treatment that is as vital to its perfect execution as it is to the many reproductions of famous masterpieces in oils, water colours or tapestry which are continually passing through the Studios.

But, in laying stress upon the advantages of high grade colour type and the services available at the ARC Studios those who chiefly employ Black and White reproduction will be interested to know that the same degree of excellence and the same unmistakable mark of individuality is equally available in this very important, if less spectacular, branch of

engraving and once again stamps the ARC Engravers as past masters of their Art.

Those concerned in "giving out" line and half-tone work know full well that however excellent the engraving may be, speed is also a factor and indeed time more often than not is the essence of the contract. It is inconceivable that the "ARC" Engraving Co. viewing with such responsibility the standard of their craftsmanship would fail to equip themselves with an adequate organisation to deal effectively and promptly with matters of urgency. It can therefore be taken as a foregone conclusion that instructions of this nature for the Press or other purposes are dealt with by a special Staff whose duty it is to see that speed is never an excuse for faulty production and that the Blocks are delivered "ON TIME."

NOTE.—This page which is an example of type and half-tone illustration produced and printed from a combined Line and Half-tone Block is issued by the ARC ENGRAVING COMPANY, 4 and 6, FARRINGDON AVENUE, LONDON, E.C.4, who will be pleased to receive your enquiries and, upon application, provide you with further specimens of their Colour Work or Black and White engraving.

SEE INDEX . . . PRINTING . . . MODERN ILLUSTRATION . . . BLOCKS

The ARC ENGRAVING CO LTD
4 & 6, Farringdon Avenue, E.C.4

The
House of Waring
 AND
THE STORY OF A GREAT IDEAL
1695 - 1930

It was one of the ideals of the House of Waring to preserve the craft of furniture-making, as it has been handed down. And to provide a great House in London where, in spacious galleries every example shown should be a work of art, even to the humblest item ; and where it was possible to purchase articles of beauty for the home, hitherto only accessible to the wealthy, at prices within the reach of all classes

A little less than a century ago, having absorbed the Gillow firm with its historic factory at Lancaster, the House of Waring set out with the ideal of re-asserting the beauty of old English furniture ; to restore the influence, if not the precise form, of those master-workers in wood of the 18th Century whose designs in furniture and home decoration combined distinctive charm with practical utility that had no equal in the world.

THE manufacturing resources of the House produced furniture at prices which have proved a revelation. The great shop in Oxford Street was founded to demonstrate the alliance of art with economy. It is a beautiful building, on the lines of Hampton Court, by Wren. Consisting of seven floors, covering over 8 acres of space, it was conceived in the spirit of providing a huge establishment where every furnishing need would be provided to meet a large public demand.

*Antiques and Reproductions are shown in a splendid series of Period apartments
 Over 100 Rooms demonstrate the characteristics of individual English Period styles
 Wonderful Eastern rugs, priceless in themselves, are reproduced at a trifling cost
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 Exquisite designs in old china are reproduced at prices for every-day use
 Glass of historic character and Georgian silver is available at the price of ordinary articles*

The Waring Showrooms of to-day are unique ; and are the Mecca of all interested in Art and the Home.

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THE
AMAZING
PROGRESS
OF GAS

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OF GAS IN BRI-
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IN CUBIC FEET

1902-159,500 million
1917-235,297 million
1925-294,756 million
1929-321,616 million

and steadily
progressing

There are over
9,000,000 gas con-
sumers, that is to
say, practically
every family in an
area of gas supply
is using gas for
some purpose.

The B.C.G.A. . . representing
the British Gas Industry, is at
the service of the public, without
charge, for information
and advice on any use of gas.

GAS

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A striking testimony

GAS IS KNOWN TO BE USED in approximately 3,000 trades or branches of trades in this country for an average of seven processes in each, and in more than 9,000,000 homes where heat is needed for something like a dozen household purposes.

BELOW IS GIVEN A LIST of illustrated booklets entitled "A Thousand and One Uses for Gas." These deal with some of the industrial, commercial and domestic uses of gas.

PROFESSIONAL AND BUSINESS MEN AND WOMEN are invited to write to the address given below naming the subject in which they are interested. The appropriate booklet will be sent without charge.

Metals—annealing, brazing, case-hardening, forging, tempering, rivet and bar-heating, die-casting, plate-heating and other heat-treatment processes.

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Motor Cars—heat-treatment of metals, core-drying, soldering, repairs. Equipment for motor garages. Repair of omnibuses.

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Food—bread, biscuit and pastry baking, canning, bottling and drying fruit, poultry farming (incubating, heating the brooder house, etc.), ripening bananas. Milk sterilising, pasteurising, churn and bottle-washing. Refrigeration.

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Theatres and Cinemas—heating, ventilation, generating electricity, lighting, catering.

Shops and Business Establishments—heating, lighting, water-heating, equipment for canteens and sports pavilions, baths.

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Public Wash Baths—water heating. Architecture and Building—Gas in housing schemes. Carcassing and fittings.

Domestic Uses—heating, lighting, cooking, water-heating, incineration, refrigeration, domestic laundry equipment, garage and greenhouse heating.

Smoke Abatement—the domestic chimney, industrial smoke, damage to buildings, the Nation's loss due to coal smoke.

THERE CAN BE NO MORE STRIKING TESTIMONY to the stability of an industry than the fact that 3,000 trades and practically 9,000,000 families use its product regularly.

*For those who wish to place money with
assurance of a secure return there is*

NO MORE ATTRACTIVE INVESTMENT THAN

GAS STOCK

BENN BROTHERS LIMITED 1880-1930 JUBILEE HISTORY.

Fifty Years' Progress in Trade Journalism.

The CHEMICAL AGE and allied publications provide a history of British industry during fifty years of unprecedented development. The rise of gas and electric lighting, of aeronautics and of electrical engineering, are among the events recorded in their pages. The following outline of the firm's activities has been compiled by Mr. J. A. Benn.

THE British Press is distinguished among all forms of private enterprise by the recognition that it is an essential public service. This special position has long been acknowledged in the Courts of Law, was repeatedly affirmed by the Government during the Great War, and is now graciously attested by the highest authority in the land. The King's message on the occasion of the Jubilee of Benn Brothers, Limited, expressing the hope that every success may attend the efforts of their publishing house for the development of British trade, is a landmark in the history of journalism. It gives the best of all sanctions to the claim of the trade journal to national status. The trade journal has taken far less time to reach maturity than either of the other main branches of journalism, the daily newspaper and the periodical review. Addison's SPECTATOR and Delane's TIMES had passed into the realm of legend before John Williams Benn founded the CABINET MAKER. Trade journalism was then in its infancy, eking out a precarious existence in comparative obscurity. Fifty years later the CABINET MAKER and a dozen other journals concerned with important British industries have taken their rightful place on the finest office site in Fleet Street, the acknowledged hub of the journalism of the world.

The first number of the first Benn journal was published in July, 1880. Its founder and editor had for some years been designer to a firm of cabinet makers in the City Road, and had contributed a weekly article to a furnishing paper. A disagreement with the Editor on the policy of the articles spurred the contributor to found a journal of his own, and thus the House of Benn came into being. "The growth of an idea" was how the founder described its great expansion in later years.

The biographer's practice of tracing continuity in a career is often more convenient than accurate, but in the case of John Benn it certainly happened that his earliest employment was selling newspapers. His father, the Revd. Julius Benn, led the hard life of an East End minister and took a newspaper shop to help support a large family. Young John did the round with the morning papers, until at the age of eleven he became office boy to a leather firm in Mincing Lane. His natural ability with the pencil already began to appear, for some portraits sketched on the borders of a sale catalogue were sufficiently life-like to bring him before the auctioneer, who warned the young clerk against poking fun at his seniors. And in 1866, at the Guildhall Industrial Exhibition, John was the youngest exhibitor and received an award for some prints of old coins, ingeniously executed with the aid of a copying press.

A few years later found him invoice clerk to the furnishing house of Lawes Randall and Company, and it was an ambition to outgrow this drudgery that led him to develop his taste for drawing. He soon noticed that designers were better paid and respected, and the candle in his bedroom was accordingly replaced by a paraffin lamp. "Between nine and eleven almost

every night"—he wrote in some Memoirs—"I was trying to learn to draw. Twice a week I went to a South Kensington art school in order to get technical training, but I made most headway at home, and after six months got up my first sheet illustrating some of our leading lines in art furniture. I screwed up my courage and showed the sheet to the head of the firm. He looked at me for a moment—it seemed like five minutes to me—and then said: "You'll never draw, my boy; it isn't in you."

That was enough to make Benn draw, and before very long he was designing furniture for some of the smaller manufacturers. In 1868, at the age of 18, he was appointed draughtsman by his own employer, at a salary of twenty shillings a week. After further experiences, which included a free-lance journey through the country in the style of "John Williams Benn and Company, of Stepney Green, furniture designers to the trade," he was appointed junior partner in Lawes Randall and Company. As his acquaintance with furniture increased Benn became convinced that the industry had fallen into a rut and that the over-ornamental style of the Victorian productions must be abandoned for the classic beauty of the eighteenth-century designs. Ruskin and William Morris had been preaching similar ideas in regard to craftsmanship, and naturally enough the young partner, who owed his advancement to artistic ability, was already an ardent reformer. The obvious outlet for his ideas was the weekly article in the FURNITURE GAZETTE, but another view was taken by Dr. Dresser, the newly-appointed art editor, who already exercised a wide influence among manufacturers and was directly opposed to the Morris school. Benn was told that his contributions were no longer wanted.

Once more the determination was roused that had prompted him to draw, and the outcome was a monthly paper of his own called the CABINET MAKER. The first number was issued at 5, Finsbury Square, from a room divided by a screen into editorial and business departments. It comprised sixteen foolscap pages and the price was sixpence. Of course the venture was regarded as ridiculous by John Benn's former partners—who thought him mad to give up a certain £500 a year, as by this time he had a wife and children to support. But the journal was no amateurish production. What distinguished it from the outset was a profusion of illustrations, the original issue of July, 1880, containing a six-page lithographic supplement. As the first leading article announced, the purpose was to provide "a pictorial record of the furniture of the day." It was to "supplement rather than supplant" the existing journal—actually the latter was soon to go out of business.

As his trade mark Benn designed a happy combination of the plane and the pencil, showing a carpenter at the bench and behind him the artist engaged on a design; underneath were the words from Shakespeare: "And work in their shirt, too;



H.M. KING GEORGE V
whose Jubilee Message to the Chairman of Benn Brothers, Ltd., expresses His Majesty's hope that "every success may attend the efforts of your publishing house for the development of British trade."

as myself." The productions of the pencil were valueless, Benn contended, unless they could be turned to account by the plane. Fifty years later this view has become so generally accepted that it is worth stressing how little favour it found in 1880. The furniture at the Royal Academy of that year, illustrated in the *CABINET MAKER*, is sufficient evidence of the popular taste, and in the hands of the Victorian manufacturer even the Chippendale style—"the most curious revival of this reproducing age"—was open to the charge of over-ornamentation. Not that all the original furniture was free of meaningless and useless ornament; but it was honest, simple and serviceable, and in essentials it harked back to the simplicity of early Queen Anne. The new journal evidently attracted attention, for not many weeks after the appearance of a rival, the editor who had rejected John Benn's ideas was hastening to assure his readers that "the rage for Queen Anne is over, so far as the educated portion of the community and the great west-end manufacturers" are concerned. And to the little group of workers in Finsbury Square it must have seemed as if he were right. Only those who went behind the editorial screen knew how precarious the position was, and seemed likely to remain. There was little enough demand for the new paper and it met with misfortune from the outset.

The First Issue.

"The packing and posting of the first issue lives in my memory as a most anxious and exciting episode," writes Mr. Henry Benn, the one survivor of the original Benn brothers. "Upon the delivery of the copies from the printers, the whole staff, from the editor to the office boy, rolled up its sleeves and set to work for dear life pasting and wrapping for the post. An open one-horse van was subsequently requisitioned to take this first consignment to the General Post Office, for free distribution to the whole of the furnishing houses in the United Kingdom. On the way to the post office, owing to the doubtful stamina of the paste and the more rapid than efficient operations of the staff, many of the copies parted company with the wrappers and had to be taken back to the office for readjustment. The subsequent period of waiting for the return of subscription forms, as a nucleus of circulation, was an anxious time, and the arrival of the post was eagerly awaited. They came in at first all too slowly to evoke enthusiasm, and it required a stout heart to face those early days of fluctuating fortune and disappointment. All who had the privilege of working with the founder of the firm look back with wonder and admiration for 'the boss' as he was affectionately though respectfully called; following his energetic lead was no light task, but his example was the inspiration of everyone on the staff. The strenuous experience of his own early years developed a feeling of sympathy and consideration for all who entered his service in after years, and a spirit of cameraderie was thus engendered which I think I may say has dominated the operations of the firm from the very first to the present time."

Paste was not the only cause of embarrassment; a subscription tout who drew commission on bogus orders was another trap which only experience could cure. But although it had to face innumerable difficulties and soon swallowed up the savings of the proprietor, the *CABINET MAKER* was already gaining ground within a few months of its appearance. The issue of October, 1880, was prefaced by a notice that the proprietors had been "compelled to reprint."

There were doubtless many acquaintances of the journeys which John Benn had made some years before as a furniture designer who welcomed the regular drawings in his new paper. Others came rapidly from the lectures which he now began to deliver in all parts of the country. Again his pencil stood him in good stead, for talks on Dickens, Cruickshank, and the charac-

ters of the London streets, were illustrated with black-board sketches. Apart from the publicity which this new activity afforded, it certainly proved the means of financing the *CABINET MAKER* at its most difficult period. In 1885 John Benn fulfilled his thousandth engagement on the platform, while continuing to carry on the journal—which meant writing, drawing and canvassing advertisements during business hours, with often a long journey to follow for the evening's lecture. The fees he asked were sometimes ridiculously low, for he suited his demand to the purse of the audience. At a Baptist chapel in the Gray's Inn Road, for example, he charged a guinea, on the 8th December, 1886, and this was one of eleven lectures delivered in nineteen nights. The amazing energy involved is seen in true proportion from the fact that John Benn was now making £2,000 a year from his platform work. "My chalks," he wrote in after years, "formed the bridge which carried me over the turn of the tide in my journal's career." It was with good reason that forty years later Sir John included a pen and pencil in the arms which he designed for his family.

The rapid progress of the *CABINET MAKER* was recognised in 1881, when the editor was asked to contribute to the Official Catalogue of the first Furniture Trades Exhibition held in September. His review of past developments and future prospects remains a masterly summary of furnishing history and concludes with some lines which time has proved an accurate forecast of the success of the journal not less than of the exhibition. "Fashion in furniture," Benn wrote, "changes almost as rapidly now as fashion in dress, and he is a wise business man who scans the horizon to see what is likely to come along next. Some good houses, large and small, have gone to the wall in consequence of adhering too much to obsolete ideas and one great advantage of this exhibition is the opportunity it affords of judging the tendency of popular taste. . . . For those who strive to elevate the furnishing trades still further in the directions of art and excellence, there is plenty of scope and a prospect of good business."

Besides his brothers, Julius, Henry, and Robert, Benn's original staff included Mr. G. D. Smith, who is to-day one of the most successful exhibition managers in the country and largely responsible for the vast dimensions to which the Furniture Trades Exhibition has now grown. In 1884 the *CABINET MAKER* was officially entrusted with the artistic printing connected with the fourth exhibition, work for which it was particularly qualified by reason of having been the first trade paper to employ zinc engraving. It is further entitled to a place in Press history as the first journal of its class to take advantage of the Meisenbach process, which it promptly adopted to reproduce photographs of prominent members of the trade.

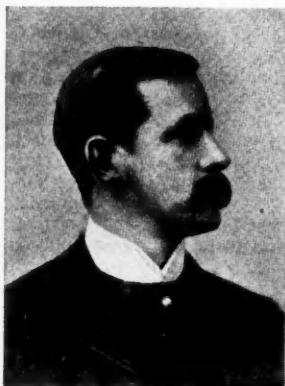
The move which Benn Brothers (J. W. Benn & Bros.) now made to larger offices at 42, City Road—the street in which the founder had obtained his first job in furnishing—was made the occasion of a permanent exhibition under the auspices of the journal. Up to this time the business had been housed in the original premises at 5, Finsbury Square, except for a temporary move to an adjoining address. The new accommodation included separate departments for printing, at 55 and 57, City Road, and anticipated to a remarkable extent the services which are provided at the firm's 1930 headquarters in Bouvierie House.

The building was surmounted with a sign-board announcing "The Cabinet Makers' Exchange and Sample Rooms." Space was available to manufacturers for the display of new inventions, and there were facilities for writing and a reference library. Admittance was open to subscribers, who were presented for the purpose with members' tickets. A passage in the *CABINET MAKER* of May, 1885, explains the objects of the Exchange. The two hundred advertisers in the pages of the journal represented almost every branch of the trade. Numerous applications

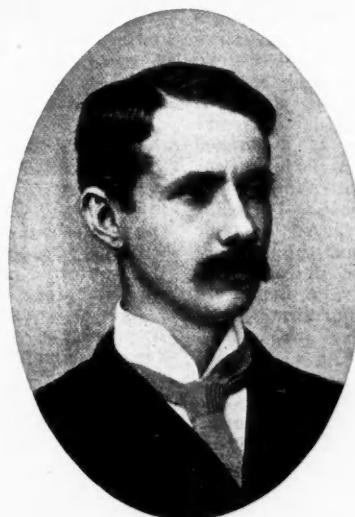


"And work in their shirt, too; as myself."—Shakespeare. The trade mark of the *CABINET MAKER* in 1880.

J. W. BENN
AND
BROTHERS

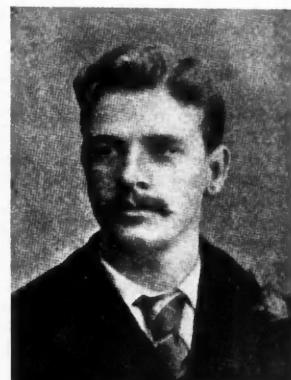


JULIUS BENN.

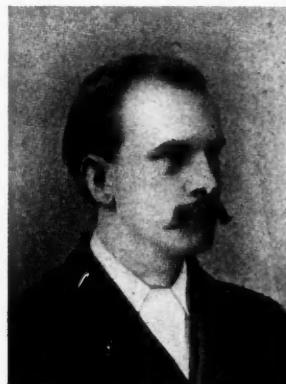


JOHN WILLIAMS BENN.

FINSBURY
SQUARE
1880



R. DAVIS BENN.



HENRY BENN.

All four brothers worked together in the publishing firm founded in 1880. Julius was responsible for the commercial side, Davis and Henry for the art department.

J. W. Benn remained Chairman of the company until his death in 1922. The only survivor of the original team is Henry Benn, who retired from business four years ago.

for the display of samples had previously had to be refused, owing to limited accommodation, but now three well-lighted floors were available to advertisers, at a nominal charge, "for the display of any invention, novelty or material which has to do with furniture or cognate industries. We are not prepared to receive any ordinary furniture which is of common-place kind, because the exhibition will not be allowed to become, nor is it intended to be, a furniture shop or bazaar. . . To steer clear of any semblance of 'going into business' and to show that our object is merely to establish a useful novelty medium between our buyers and sellers, we distinctly decline to accept any commission or consideration for orders which may be taken through the Exchange." Advertisers were further offered the publishers' assistance in distributing catalogues, booking orders, and in general supplying a complete service to the trade at the centre of the city furniture market. The Exchange was opened on the fifth anniversary, in July, large firms having already taken space, and for some years it was regularly used by manufacturers, especially visitors from the Provinces.

With the seventh volume, in 1886, the dimensions of the journal were enlarged, the original foolscap size being abandoned for the format in which the CABINET MAKER still appears in 1930. In September a serious fire at the printers' premises destroyed the complete stock of blocks and paper, none of them insured. But all this time John Benn was continuing to lecture, so maintaining the finances of his business. In 1893 the title page embodied the words "Five Journals in One." This statement heralded the change which was rapidly coming over the furnishing trade. Firms that had originally confined their production to cabinet making now opened departments for the sale of carpets, decorating materials and so forth, and the era of

the giant furnishing "stores" was already in sight. In keeping with this growth and development, John Benn published regular sections on these new subjects, which he named respectively the Upholstery and Decorating Journal, the Carpet and Floor-covering Record, the Timber Yard and Woodworking Machinist, and the Furnishing Hardware Guide. In 1902 the comprehensive heading was adopted by which the journal has been known ever since—the CABINET MAKER AND COMPLETE HOUSE FURNISHER.

Art in Industry.

The improved taste which marks the English homes of to-day in contrast with those of the 'eighties is not due to the influence of small groups of craftsmen; the general level has been raised through the ordinary trade. What John Benn set out to do fifty years ago was to bring artistic ideas to the trade itself, in proving to manufacturers that the most profitable course for them lay in a return to the best English traditions of solid workmanship and good design. Some people may think that in his advocacy of the seventeenth and eighteenth century styles he was too successful, and that the modern trade devotes too much attention to reproductions. It can only be said that in the many articles he contributed to the CABINET MAKER Benn was never an advocate of slavish imitation. He had no patience with the *chinoiserie*s of Chippendale and, as already stated, he often complained of the excessive ornament of this later work. What he did stress were the admirable proportions and solid workmanship of the earlier cabinet-makers. "It is well to bear in mind," Benn wrote, "that the mere reproduction of originals is bad; they should merely form the ground work of fresh thought and arrangement."

The significance of these views is recalled by Lord Waring, who was acquainted with Benn as early as 1875 and was among

his oldest friends at the time of his death in 1922. Only those who can remember the furnishing trade as it was fifty years ago can fully appreciate the great change that has since occurred. Every small manufacturer was in those days his own designer, with the result that the poverty of designs only equalled the quantities of furniture produced. The public thinks of furnishing in terms of the great West End firms, but these are only representative of the vast size of the trade that is pursued in small factories all over the country. It was while Benn was travelling for Lawes Randall that he first met Lord Waring, who attended one of his earliest lectures in Liverpool and saw the "lightning sketches" for which he soon acquired a public reputation. "By emphasising the period styles in the pages of his new journal," Lord Waring states, "the late Sir John Benn performed a service that was of the greatest value in the era of development and expansion into which the furnishing trade was about to enter."

The Second Generation.

From the outset in 1880 the firm had witnessed the co-operation of four brothers. Eleven years later they were joined by a second generation of the family. In order to prepare his sons for business, John Benn sent them to Paris in 1888 to study art. In 1891 the eldest son (the present Chairman, Sir Ernest Benn) entered the business as office boy. At the age of seventeen he was transferred to the studio to learn to draw, but soon abandoned art for the commercial side of the enterprise. Before long the second son, Wedgwood Benn, joined the staff and for some time edited the *CABINET MAKER* in conjunction with Robert Davis Benn. In 1902 Wedgwood was adopted Liberal candidate for the St. George's division, and finally relinquished business for politics on his election to Parliament in 1906. Meanwhile he had made a business tour in South Africa and he also conducted another journal known as the *HOUSE*. For more than twenty years since his main interests have been political, and he was appointed Secretary of State for India in Mr. MacDonald's Government after the 1929 election.

Mr. Ernest Benn, after working for six years on the road selling advertisement space for the *CABINET MAKER*, now took the first step in expanding the business which has since been under his direction for some thirty years. In December, 1899, the *HARDWARE TRADE JOURNAL* was put up for sale by its proprietors, Messrs. Hazell, Watson & Viney, who offered it to Benn Brothers. "If my father had acted as I imagine most fathers would have done," Ernest Benn confesses, "he would have bought the journal, added it to his own business, and reaped for himself the benefit of any profit that might be made, keeping the son, as so many are kept, in a subordinate position, to wait for dead men's shoes. That is the usual method of procedure. My father was built of different material." While allowing his son to continue to manage the *CABINET MAKER*, John Benn at once gave the *HARDWARE TRADE JOURNAL* into his sole control. At that time the new property had a total revenue of under £2,000 a year, barely sufficient to cover production costs and sometimes equalled, in 1930, by the income of a single issue.

Just as Sir Ernest thus acknowledges his debt to his father, so the founder of Benn Brothers, writing towards the end of his life, paid tribute to the son who from 1900 onwards proceeded to develop the business. "The *CABINET MAKER*," he said, "was the corner-stone but the bricks for the House that Benn built have been collected and well and truly laid by my eldest son." Probably only the Benn family circle and those who were connected with the business in the early part of the present century can realise to the full how well merited the praise was. As one of the "older generation" writes: "Strength of character and a purposeful resoluteness were needed to guide the destinies of the publishing firm to the sound and pre-eminent position that it occupies to-day. The difficulties that beset a young and growing business with only limited capital available continued to arise. They were all faced and overcome by

Ernest Benn, who had the satisfaction of seeing the fruits of his energy in balance-sheets which showed steady improvement during the next thirty years. As the business grew, so he emerged more and more clearly as the dominating personality, whose daring tempered with sound judgment not only created fresh activities but developed and expanded those that already existed. . . . In this way the opportunity and the man found each other."

To the founder of the firm the co-operation of his sons was increasingly valuable, for in 1889 John Benn was elected to the first London County Council, and thereafter continued to devote the greater part of his time to public work. It was in connection with the inauguration of the tramway service that a Knighthood was conferred in 1905, followed by the Baronetcy with which Sir John was further honoured in 1914.

At the outset of his career the present Chairman of Benn Brothers had to repair a disastrous failure from which he "learnt more about the publishing business than ever before or since." The *HOUSE*—the publication in question—was also largely responsible for keeping John Benn on a very modest income. To begin with, some of his staff had left to start a rival paper, called *FURNITURE AND DECORATION*—now the *FURNITURE RECORD*—and he had promptly countered with a costly subsidiary to the *CABINET MAKER*, of more popular appeal, which ran for a few months only. This soon led to Benn's putting into practice a long-cherished idea, to provide a paper dealing with all the practical matters of home equipment. During the next four years in which the *HOUSE* was published, it anticipated nearly every aspect of such present-day successes as *Good HOUSEKEEPING*. Even the revolutionary departure was made of enlisting the services of women journalists, Miss E. I. Benn and Mrs. Holmes joining the staff to deal with the domestic arts. As events were to show, the magazine was before its time. Perhaps it was a trifle technical in its appeal, but in view of the enormous sale of its modern counterparts, the experiment remains of permanent interest. It was not alone among pioneer publications which Benn Brothers have issued and failed to establish.

The first number of the *HOUSE* appeared in March, 1897, as a sixpenny monthly "for those who manage and beautify the home." "There are now dozens of journals which have to do with the dressing and adornment of the body," the editor explained; "but, strange to say, there is not one dealing exclusively or specially with the dressing of the house. . . . If we find a welcome on the doorstep we shall take possession, and peer and poke into every corner of the domicile, from the kitchen to the roof, assuming indeed the rôle of friendly critic to the family." There were articles on furniture and china, needlework, pictures, and books, as well as "The Cook's Instructions," embodying specimen menus for the month. Silver, home carpentering were other features—altogether a decidedly ambitious scope for an entirely new departure in publishing. Some of the best drawings in its pages were those by Mr. W. C. Baldock, who from 1895 onwards worked with the firm for over thirty years. His skill had already shown itself in the zinc-engraving process, which involved drawing directly on to the metal plate used for reproduction.

"The Hardware Trade Journal."

As manager of the *HOUSE*, which after four years had to be pronounced a commercial failure, Ernest Benn came to recognise that catering for the general reader requires a distinct technique. Accordingly he determined that success depended on specialisation and for the next twenty years Benn Brothers confined their activities to the special class of publication with which the firm had started—the trade and technical journal.

While the *CABINET MAKER* was now paying its way and already foreshadowing its position of 1930, the fortunes of the *HARDWARE TRADE JOURNAL* began to be laid. The paper had been founded in 1874 as the circular of a big factoring house



42, CITY ROAD, E.C.
The offices of Benn Brothers
half a century ago.

of those days, Martineau and Smith, before passing into the hands of Hazell, Watson & Viney. In December, 1899, Mr. F. J. Francis, for twenty years previously a sub-editor of the IRONMONGER, secured an option to purchase the smaller monthly, and brought the proposition to Benn Brothers.

The next steps forward in the history of the HARDWARE TRADE JOURNAL were the incorporation of IRONMONGERY in 1900 and the change from a monthly to a weekly issue in 1901—a practice that was adopted four years later for the CABINET MAKER also. From the wealth of incidents associated with the story of the second Benn journal, as of their other publications, one fact emerges as supremely important. The ideal of service that brought the journal into being has been responsible for its amazing growth, alike in size and influence. The desire of a single firm of hardware manufacturers to keep its customers regularly informed of its wares was limited, in contrast with the wider conception of disinterestedly serving one of the nation's biggest industries; but service was there just the same.

The single sheet that constituted the first issue in January, 1874, was followed next month by a number containing two illustrations—one of a coach wrench and the other of the "Scarborough" iron trunk. A paragraph published about this time makes curious reading half a century later. This was a description of "The New Game of Garden Tennis," which announced that four rackets, twelve balls, with portable poles, a net of 15 ft. by 4 ft. 6 in., with guard nets, hammer, cords, pins and book of rules, in case complete, could be acquired for the modest sum of £2 7s. 6d. In the year 1878 the journal gave space to the municipal gas exhibitions—"a decided novelty"—and interest was also roused by experiments with electric lighting which were evidently very diverse in results. Cheek by jowl with a paragraph to the effect that this innovation had proved "practically successful" at the reading room of the British Museum was another stating that the electric light at Billingsgate Market was a failure.

The Paris Exhibition, 1878.

John Benn once confessed that the idea of starting a paper of his own first took definite shape when he visited the Paris International Exhibition in 1878. It happened by a coincidence that another visitor to the same event represented the HARDWARE TRADE JOURNAL, which celebrated the occasion with an illustrated supplement. This special correspondent prefaced his report with a host of personal grievances respecting his treatment at the hands of the French, before he got down to the business in hand—the descriptive story of the Exhibition. The lot of the trade journalist provides experiences as interesting as are to be found in any career. A typical incident occurred to John Benn during one of the visits to foreign art galleries, reports of which soon became a feature of the CABINET MAKER. He had gone to Italy in search of material and was one day sketching some decorative items in the palace of King Bomba at Naples. "While thus innocently engaged," he afterwards wrote, "I found myself seized by an officer and marched off to the Bureau, charged, as far as I could understand, with making a plan of the place for military purposes. My book was taken from me and examined, but when the innocent nature of the contents was discovered it was returned and I was set at liberty. Some caricatures of Italian life, which greatly amused the curator, saved me. A few days afterwards, while sketching in the National Museum of Naples, I saw another soldier, more fierce looking than number one, approaching me, and at once concluded that he was on the same mission. I pocketed my book and proceeded to leave the apartment, but he got in front of me and offered me a piece of blue paper with some writing

upon it. It looked so much like a summons that I promptly declined it in the best Italian I could command, but he persisted in offering it, so I took it from him. What was my surprise to see written thereon in a good round hand, in English, the following words: 'How is your aunt? Was she quite well when you last saw her?' etc. For a moment I could not understand why this dusky son of Mars should take such an interest in my estimable aunt. The mystery was soon explained. This soldier was very wisely employing his leisure, of which he had plenty, to learn English. Noticing my English appearance, he had applied to me for the correct pronunciation. I readily assisted him and in return he showed me some parts of that wonderful museum which I should not otherwise have seen."

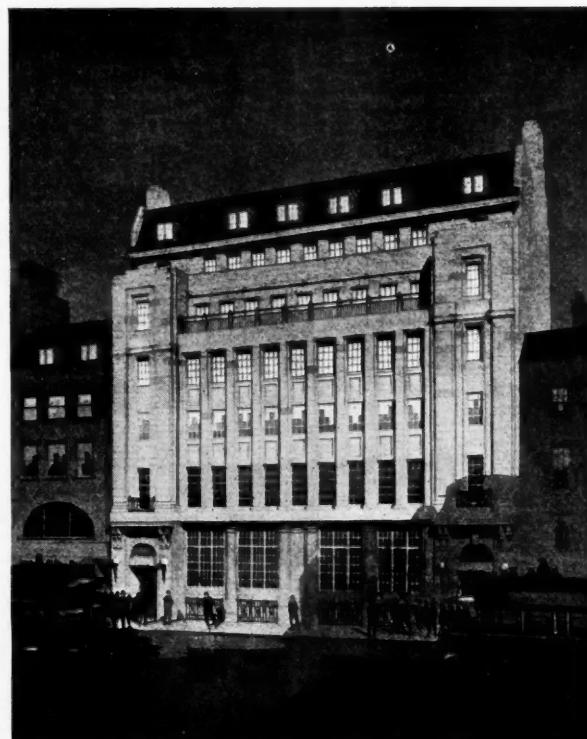
On his foreign travels the Editor of the CABINET MAKER was usually accompanied by his brother, Mr. Henry Benn, who completed nearly fifty years' service with the firm before his retirement in 1926. For many years the artistic side of the journal was entirely in his control and in the course of his career he has published three books—"Characteristics of Old Furniture," "The Nation's Treasures" and "Style Schemes in Period House Furnishing."

Party politics have always been regarded as outside the sphere of trade journalism, but questions affecting the organisation of industry and the status of those engaged in its ranks were receiving attention as early as 1880. The files of the HARDWARE TRADE JOURNAL reveal that for the next ten years there was developing a keen interest in shop assistants and in the Ironmongers' Association movement, which began in April, 1879, when a few ironmongers met at Salisbury and unanimously decided to form an Association with the object of protecting the interests of the trade. Later, during the Royal Show week, a meeting was held at Anderton's Hotel in Fleet Street, London. Mr. Lindsey (who was then Editor) took a prominent part in ensuring the success of the early meetings, and striking testimony to the help received is found in a resolution passed by the Association, expressing its thanks to the proprietors "for their thoughtfulness in requesting the Editor of the HARDWARE TRADE JOURNAL to attend and report the proceedings, and especially for their generous offer to print and supply to the Association 5,000 copies of such report for distribution among the ironmongery trade throughout the country."

A few years later the HARDWARE TRADE JOURNAL took an active part in the formation of the National Hardware Association, at the time when Mr. Thomas Coates was editor. Later still the journal gave prominent attention to the Ironmongers' Federated Association, the national trade body that to this day continues to grow in influence and in membership.

Price Maintenance.

While discussing the interests of the retailer, a word may be said about a movement known as "price maintenance" in which the HARDWARE TRADE JOURNAL played a leading part about this time. Strange as it may sound to-day, the difficulty in the early part of the century was to get the shopkeeper to make sufficient profit and in some cases any profit at all. In his desire to serve his customers the tendency was to cut the price of an article to a point at which it was worth nobody's while to touch it. In self-defence manufacturers at length initiated "price maintenance," an endeavour to force merchants and retailers to preserve a fixed price in the selling of these articles. For a young and inexperienced publisher Ernest Benn did a very daring thing in this connection. A big firm of drapers in the provinces, with a reputation for price-cutting, bought quantities



BOUVERIE HOUSE, FLEET STREET.
The 1930 offices of Benn Brothers, Ltd., and Associated Companies.

of hardware goods—branded lines that had been well advertised—and offered them to the public at prices less than the actual wholesale figures. On the principle of throwing a sprat to catch a mackerel, these drapers were by this means attracting custom to their drapery wares.

"I sought out a drapery expert," Sir Ernest writes, "and induced him to visit the various establishments of this great drapery firm and make purchases of smaller lines, not so well-known to the public and upon which the margin of profit or loss was not so obvious. My expert came back with a bunch of receipted bills and a bag full of drapery sundries—half a yard of veiling; a yard of delaine; a boy's shirt; a pair of braces; a pair of corsets; and, I think, some shoes. On each of these articles the drapers in question had made a profit which varied from 200 per cent. in the case of the corsets, to something over 700 per cent. in the case of the veiling. I published a series of articles explaining how these people were persuading the public that they were real agents of economy when, as a matter of fact, at the expense of my hardware manufacturers, they were securing exorbitant profits upon most of their own merchandise. It brought me very near to a law suit, but we made the most of it. We published double-column advertisements in the local newspapers, offering to subscribe £200 to the hospitals if our statements should prove unfounded." Another case occurred a year later, when the HARDWARE TRADE JOURNAL convicted one of its biggest advertisers of similar practices. The case cost the paper a good customer and lost advertising revenue it could ill afford, but it was good journalism and undoubtedly good service to the trade as well.

From 1900 onwards the management of the journal was undertaken by Mr. Ernest Benn, who also edited the paper personally for some years. In 1907 Mr. E. E. Starke was appointed manager, having entered the business some ten years before as office boy. When the writer of fiction takes a successful man of business as his hero he always makes him start in this junior position and the majority of readers, smiling indulgently, say that these things happen in books but not in real life. They happen, however, in Benn Brothers, for it was in response to an advertisement in the DAILY TELEGRAPH that Edgar Starke applied for the job at eight shillings a week, which started him on the ladder to his present position. A period of addressing wrappers and filling the office coal-scuttles was followed by work on subscriptions, which in turn led to his appointment as representative of the Benn Brothers' journals in the provinces. Very soon the results of his energy and initiative began to show, and when in 1907 he was given control of the HARDWARE TRADE JOURNAL's advertisement department, the foundations of its present success were laid. When the CHEMICAL AGE was founded in 1919 it was established on the business side by Mr. Starke, and his numerous activities led to his appointment as a director of Benn Brothers in 1923.

Daily Trade Papers.

The foundation of the Institute of Metals in 1908 was marked by a special extra issue of the HARDWARE TRADE JOURNAL, published on the day following the ordinary weekly issue. Hitherto the non-ferrous metal interests of Britain had possessed no central organisation, and this journal was the first trade publication to deal with the activities of the new body. The pages of that first issue contain articles by metallurgists whose names have since become world-famous—among them Walter Rosenhain, B.A. (now Director of Metallurgy at the National Physical Laboratory) and Professor Cecil Desch. A similar enterprise in the subsequent history of the journal was the publication of a daily issue, which before the war was undertaken during the Ironmongers' Federation Conference week, giving a full account of each day's proceedings, with sketches by its own artists. For many years illustrations, in particular of the "lighter side" of the hardware business, have been a prominent feature of the paper. A continuance of this policy was witnessed after the war, when the first page of weekly "news pictures" appeared in 1923 and has since been adopted by most of the leading trade papers. Credit for this last development is due to the enterprise of the present Editor, Mr. Norman French, who had a wide experience in the newspaper field before joining Benn Brothers in 1918. An interesting link with the firm had occurred many years before, when at the age of fifteen he was already sending paragraphs to the CABINET MAKER in such hours as he could spare from work as a junior reporter on the BRADFORD POST.

Perhaps the most striking indication of the position in recent years was the £1,000 prize—believed to be the biggest ever offered by the trade press—which the HARDWARE TRADE JOURNAL paid in 1924. The competition was designed to estimate the

volume of the nation's business represented by hardware and was keenly contested for throughout the country. Retail ironmongers were invited to keep a record of their purchases from advertisers and others, from which it became clear that the hardware shops throughout the country were doing an annual business of not less than £80,000,000. In the attainment of this large turnover the hardware press can claim to play no small part, and the total serves to emphasise a point stressed before in this story—how large a share of the national trade budget is accounted for by the often despised "middle man."

Move to Larger Offices.

The twenty-fifth anniversary of the CABINET MAKER on July 1, 1905, was marked by conversion of the monthly into a weekly publication, the price being reduced from sixpence to one penny per copy. Already the journal had grown to substantial proportions, carrying more than fifty pages of advertisements. Some years before, the editorial staff had been joined by Mr. H. P. Shapland, who had a wide practical experience of furniture besides an architectural training. Until his retirement from the business in 1927, he continued to act as editor, introducing many vigorous ideas and generally developing the artistic side of the paper. In his wider capacity as a director of Benn Brothers, Mr. Shapland guided the editorial policy of all the journals, and his experience was also of invaluable aid during the building of the Company's latest premises—Bouverie House, Fleet Street. But that is to anticipate events, for we must here note the move which occurred in 1906, when the expansion of the business made it necessary to seek larger offices.

A site was purchased in Christopher Street, Finsbury, and a six-storey building erected that was to be the home of Benn Brothers for the next ten years. The firm moved in September, 1906. The autumn issue brought out that month created a record at the time as the largest periodical ever issued to the furnishing trade. The circulation was 10,000 copies. Special rooms in the new building were again available for readers, as had been the case at the City Road premises. The "Cabinet Maker Rendezvous" was opened on November 27 by Lord Monkswell. As a colleague of Sir John Benn on the London County Council, he took a keen interest in the trade, and when Chairman of the Council two years before had attended the inaugural dinner of the Furnishing Trades Provident and Benevolent Association. The need for this charity had been apparent for some time to leading members of the trade and its practical realisation was largely due to Mr. Sol Lebus and Mr. Samuel (now Lord) Waring. Only after repeated efforts was the necessary finance procured, the project being assisted through the columns of the CABINET MAKER. The enthusiastic support of the publishers has been continued throughout its first quarter-century. As the latest endeavour, in the spring of 1930, Benn Brothers' dramatic circle gave a performance at the Scala Theatre in aid of the Association's funds.

The close connection of the journal with this aspect of the trade has been maintained until the present time, and no one devoted more energy to its development than Mr. H. B. Crole-Rees, who was appointed manager in 1911. From the moment of joining the staff of Benn Brothers in 1909, when he sold advertisement space for the EXPORT WORLD, H. B. Crole-Rees has been tireless in his enthusiasm for everything connected with the Company, while establishing intimate friendships with members of the furnishing trade and in advertising circles generally. At the Olympia exhibitions since the War, the successful conduct of Benn Brothers' interests has rested mainly with Mr. Crole-Rees, and at the 1929 International Advertising Convention held in Berlin he represented the firm in conjunction with Sir Ernest Benn. It was no surprise to the staff when "C.-R."—as he is affectionately called—was appointed a Director in 1925. The management of the CABINET MAKER is now in the able hands of Mr. N. B. Mellor. The Editor, Captain E. W. Gregory, has had an unusually wide experience of the trade and was for some years in charge of the FURNITURE TRADE ORGANISER. His artistic abilities are not confined to cabinet-making, and high prices are paid for the water-colour drawings which he occasionally exhibits.

After Sir John Benn's election to the L.C.C., the direction of business was left mainly to his brother Julius. Davis and Henry also were actively engaged in editorial work, with Mr. Ernest Benn responsible for the commercial side. Early in May, 1907, the original "team" of Benn Brothers was impaired by the death of Davis Benn, at the early age of thirty-seven. In his brief career he had acquired a reputation in art that extended beyond the sphere of trade journalism. A book which Messrs. Longmans Green commissioned him to write became a

standard work on "Style in Furniture" and at once established him as an expert in this subject. Davis also acquired considerable ability at the piano and for some years assisted John Benn in his professional lectures.

"The Export World."

Having successfully established two papers and failed with a third, Benn Brothers next founded the *EXPORT WORLD*, in 1907. The principal paper in the field at that time was the *BRITISH TRADE JOURNAL* (now amalgamated with the *EXPORT WORLD*), but there was ample scope for the new monthly, which soon became widely known as the "shop window of British commerce." Encouraged by this experience, the publishers followed it by another important endeavour in the interests of overseas trade. The ideal method of advertising British goods in foreign countries was to do so in the local language, and accordingly the publication was commenced in Buenos Ayres of a monthly journal, printed in Spanish, with the title *EL COMERCIALE ARGENTINO*. In this connection Sir John Benn visited the Argentine in 1910, where he was received as a guest of the Republic. A wonderful opportunity was afforded to secure an insight into the fundamentals of South American commerce. Accompanied by Lady Benn, he visited all the principal centres from Buenos Ayres to Valparaiso. Some years later this Spanish journal had to be discontinued owing to the War, but in the short period of its existence it established claims to being the most successful publication of its kind ever produced. The enterprise has its modern counterpart in the Spanish edition of the *BRITISH TRADE JOURNAL*, with the distinction that this is printed in London and afterwards distributed abroad. A similar idea in regard to the Chinese market was in contemplation when war broke out, and it may possibly be revived among the future endeavours of the publishers. In 1912 the *EXPORT WORLD* was strengthened by the acquisition of *COMMERCIAL INTELLIGENCE*. Benn Brothers had already added to their foreign connections by acting as agents for *INTERNATIONAL MARINE ENGINEERING*. This journal was published in New York, and naturally the War made its discontinuance necessary so far as the London end was concerned.

Everyone remembers the slogan which made its appearance on the outbreak of war. Once it was seen that the nation was in for a prolonged struggle, "Business as usual" appeared in every shop window, traders realising that renewed efforts must be made if supplies were to be maintained. This duty in the new emergency was promptly recognised by the *CABINET MAKER*, which in a leading article of August 15, 1914, named among the King's Enemies not only those who hoarded gold and food but "the employer who discharges a man except from the direct necessity, the man who does anything to disturb the normal condition of business, the man who thinks of his profits before his country, the man who needlessly cancels a contract." Though itself already reduced in size, the journal ten days later came out with the headline "Capture German Trade," over an article urging British manufacturers to tackle in particular the carpet trade. Full details were published of the exports of carpets, rugs, etc., from Germany and Austria-Hungary to the neutral markets of the world, coupled with the slogan "Fight the Enemy from your Office Desk." In pursuance of this plan, a German Trade Register was initiated in September, merchants being invited to send the Editor confidential particulars of goods previously bought from the hostile powers, also of sales made abroad and now available for British markets. The information was registered by the journal and used to effect introductions, thus retaining within the country the import and export trade hitherto carried on with Germany.

Normal trade operations became increasingly restricted, but business men as a whole were slow to admit that the War would be of long duration. Once again the initiative rested with the trade journals, which foresaw the need for adapting factories to military requirements. Among the first steps in

this direction were the special Aircraft Issues published by the *CABINET MAKER*. A huge demand for aeroplanes had suddenly been created and could only be satisfied by every available wood-working plant being converted for their manufacture. Raw materials for domestic products were strictly controlled and supplies diverted for the production of propellers, wing-frames and other aeroplane parts. Twice a month, from early in 1915, the journal devoted its pages to the new subject and this information was of great service to the "mobilised" industry.

Long before conscription came into force, the staff of Benn Brothers was already diminishing in numbers. Mr. Oliver Benn, the youngest son of Sir John, who for some years had represented the firm in Lancashire, was among the earliest to enlist, having already obtained a commission in the Territorial Army. Another director, Mr. C. E. Hughes, joined the East Indies and Egypt Seaplane Squadron, of which he has written the history under the title "Above and Beyond Palestine." Very soon many principal posts were vacated and came again under the personal control of Sir John Benn, who resumed active work in the business. While remaining Chairman, he had previously left its direction to Mr. Ernest Benn, who now gave part of his time to work at the Ministry of Munitions.

Many casualties in the ranks of the firm occurred in the next few years. None was more keenly felt by the staff as a whole than the loss of "Mr. Oliver," who was reported missing in

Gallipoli in the spring of 1915. For two years the family made exhaustive enquiries but without definite news, and it then became necessary to assume his death, which had occurred at the early age of 28. From boyhood he had good health, but in 1911-12 he was obliged to winter in Switzerland. On the outbreak of war he at once attempted to join the Army, but the doctors declared him unfit and he was thus kept in civil life for a few weeks. But nothing could dissuade him from repeated efforts to join up, and in October, 1914, he was gazetted to the 9th Somerset Light Infantry. Previous military experience in the 7th Manchesters proved useful to him, and he soon secured his third star.

Early in 1915 a draft of officers was required for Gallipoli and, with a dozen others, only one of whom has returned, he set sail from Plymouth on May 10. On May 29 he arrived at the Peninsula, and was given command of the X Company of the 1st Essex Regiment. Within a week he led an attack on trenches in front of Achi Baba, and on the night of June 5-6 was reported missing. The Company lost three captains in a fortnight, and Oliver Benn was one of them. It

is therefore not surprising that no authentic details are available of the manner of his death. Survivors of the battle who were traced in hospitals in England and in Egypt gave varying stories, but all agree on one point, that he led his men into action with a fearlessness and cheer worthy of the "regulars" whom he had the honour of commanding.

Advertising the Army.

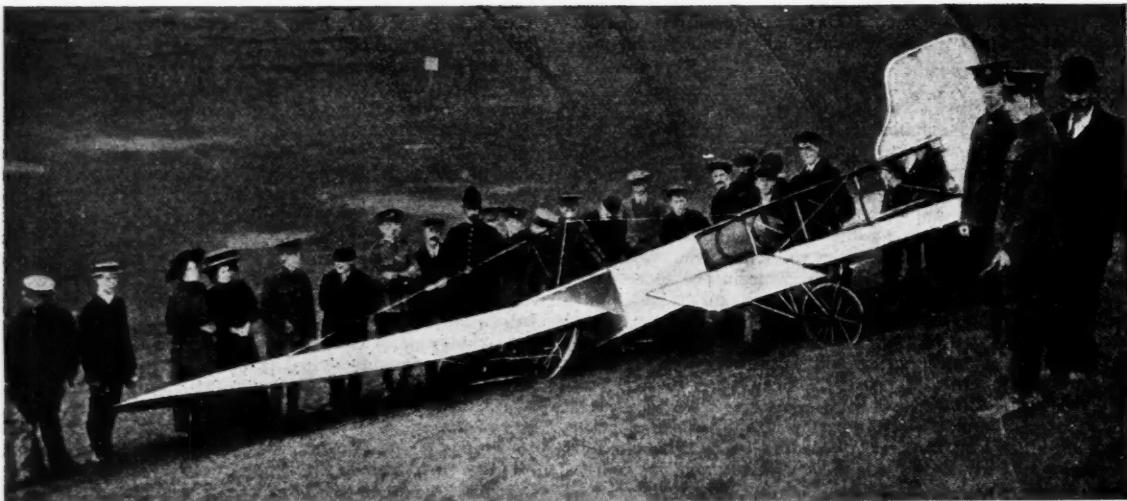
"Oliver Benn was one of the keenest of men," a colleague wrote. "He gave of his best in whatever he undertook; nothing could daunt or discourage him. It will be hard to find his equal as an advertising man. He was a keen yachtsman, and some years ago in company with his brother Wedgwood, he cruised across the North Sea in a seven-ton smack. As showing his love for the Army, a circumstance should be recorded which is of special interest in view of later developments. Two years before the War he prepared a memorandum on 'Advertising the Army' in which he argued that the Territorial Force could be enlarged and encouraged by this means. The document was submitted to his superiors in the Manchester Regiment and to other authorities, but in those days it was considered unthinkable that the War Office could descend to advertising. Most of his ideas were afterwards adopted in the famous recruiting campaign for 'Kitchener's Army.'"

As the War progressed, Benn Brothers had to face an



CAPTAIN OLIVER BENN.

Before the war Manchester representative of Benn Brothers, Ltd.; killed in Gallipoli, June, 1915



Bleriot's machine as it appeared on landing in the field behind Dover Castle, after the first cross-Channel flight, July 25, 1909. (Photograph reproduced from AERONAUTICS, August, 1909.)

increasing shortage of staff in common with other businesses. It was not surprising that the opportunity soon arose to acquire some smaller publications that were experiencing even greater difficulties. The first of these was a pioneer flying paper known as *AERONAUTICS*, founded in 1907 and first edited by Major B. Baden Powell and Mr. J. H. Ledebur. The journal had been started two years before the first flight over the Channel and was devoted from the outset to the technical aspects of aviation. Gradually it grew from a monthly of slim proportions to an established weekly and it was among the few publications that received an immediate benefit from the War. No science developed so rapidly as aeronautics and many experts hitherto regarded with mild amusement on account of their eccentric hobby, at once found their value recognised.

The First Hundred Aviators.

The copyright of *AERONAUTICS* was acquired by Benn Brothers in 1917, and the most important event in its history occurred in July, 1920, when a dinner was organised to the first hundred British aviators and pioneers of British aviation. When the plan to hold the function was announced it met with such an immediate and widespread response that a committee of hosts was formed, which included Lord Desborough, Major-General Seely, Sir Charles (now Lord) Wakefield, Mr. Ernest Benn and the Editor, Major C. C. Turner. The pioneer character of the journal made it well fitted to organise this function, and another qualification existed in the presence on its staff of Major Blake, the first Englishman to fly round the world. The principal guest was the Duke of York, himself an experienced pilot.

The speakers at the banquet included Mr. H. G. Wells, whose claim to pay tribute to the pioneers of flying was that he had advocated the aeroplane and the airship in his writings over a quarter of a century before. An eloquent tribute was paid in this speech to the international value of aviation, Mr. Wells expressing the view that flying had gained all it would ever get out of war and that its future progress rested entirely on the peaceful development of air routes throughout the world. Captain Wedgwood Benn, D.S.O., D.F.C., supported this prophecy. "No doubt," he said, "incredible things were achieved under the urgent incentive of war, but I think we should utterly lack perspective if we regarded the work of the pioneers of aviation merely as a preparation for that or for any war. Flying annihilates space and is the greatest civilising agent that has ever been known."

AERONAUTICS continued to flourish during the period when flying was gradually passing out of the control of the Government into private hands. But with the return to peace, the demand for aeroplanes diminished rapidly, and the journal was among the first enterprises to feel these effects. Had its pages catered for purely popular flying the position might have been otherwise, but the purpose had been from the outset to provide a technical review. In 1921 *AERONAUTICS* ceased publication as a separate entity and was amalgamated with the *EXPORT WORLD*.

Another enterprise acquired by Benn Brothers in 1917 was the *ELECTRICIAN* Printing and Publishing Company, which besides the journal of that name issued the *FRUIT GROWER*. The printing business was separately disposed of and the two papers added to Benn Brothers' list.

Although dealing with a science which is generally regarded as a new one, the *ELECTRICIAN* was founded in 1861, and is thus the oldest of the trade and technical papers published by Benn Brothers. An early proprietor was Sir John Pender, and the first issues were edited by Mr. Desmond Fitzgerald. At that time application of electricity was practically confined to telegraphy, the first efficient submarine telegraph cable having been laid between Dover and Calais in 1851. No celebration in the life of a journal connected with electrical science would be complete without mentioning the name of Faraday. In 1861 Faraday was still living, though his great work on electromagnetism had been done some thirty years before, and he was at that time enjoying an honourable retirement. It is a matter of interest and congratulation that he was an early contributor, and special attention may be drawn to an article from his pen on "Electrical Illumination for Lighthouses," which appeared in the issue of August 22, 1862. There are now few lighthouses that are not electrically lighted.

This first series of the *ELECTRICIAN* ended in May, 1864, and a new series was commenced in May, 1878, when electric lighting provided a more extended field for journalistic enterprise than was available during the former life of the paper. The telephone was also coming into use at this time, and the invention and development of these two important aids to the conduct of affairs coincides with the Jubilee period of Benn Brothers. It was nearly thirty years after the establishment of the journal before that great expansion in the use of electric power for the propulsion of trams and the operation of electric railways took place, a growth which has continued on an increasing scale ever since.

An Editor's Foresight.

The earlier editors deserve commendation for their foresight in recognising the prospective value of theoretical papers, which were destined to become of great practical value in after-years. An instance of this was the publication of Mr. Oliver Heaviside's long series of articles on "Electromagnetic Theory," which was not dealt with in any other publication at the time. Actually it was to prove of invaluable application in the era of telephony and electric power transmission about to begin. For all practical purposes, the theory had been scoffed at by the electrical authorities of his time, including no less a person than Sir William Preece, for many years chief telegraphic engineer to the Post Office. The main subject on which the fame of Heaviside rests, and which aroused bitter controversy, was his development of the theory of cable signalling. This theory was begun by Lord Kelvin, whose work had rendered possible the Atlantic Cable of 1865, after the failure of the 1858 cable, but it was incomplete. It remained for Heaviside to recast and remodel the theory in a more general form. Briefly, he

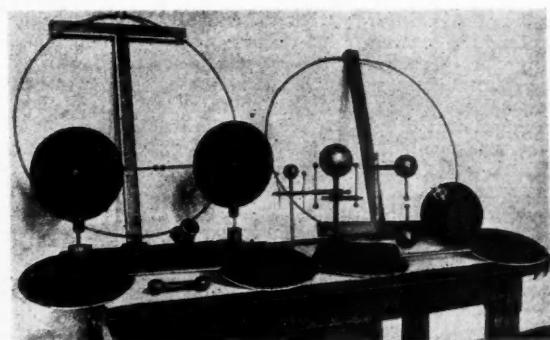
showed that the laws governing propagation of signals along wires were in many essential respects identical with the laws for electric waves in free space, thus paving the way for long-distance and wireless telephony.

In the period of his adversity, Heaviside found a staunch friend in C. H. W. Biggs, then editor of the *ELECTRICIAN*. Like every genuis, Heaviside was apt to exhibit idiosyncrasies. He had almost a passion for having his work published exactly as it was written, and he once went so far as to say that experience had taught him that "the refusal of a paper by any journal, for unconvincing conventional reasons, implies that the paper is unusually original and good." He was undoubtedly a "difficult" contributor, and the editor's recognition of his work was all the more creditable. In the opinion of Mr. Rollo Appleyard (author of "Pioneers of Electrical Communication"), the stalwart support of Heaviside by Biggs—amidst strife, satire and probable financial loss—remains the finest action to the credit of technical literature in our time. It ought also to be recorded that it was in the pages of this journal that Heaviside introduced and built up the new terminology needed for the development of his epoch-making theory.

Among other notable contributions published in the early volumes of the *ELECTRICIAN* was Dr. (now Sir) Oliver Lodge's "Signalling across Space without Wires." This pioneer treatise was first issued in 1894 under the title "The Work of Hertz and his Successors," and it comprised the lecture given by the author before the Royal Institution on June 1 of that year. The subject was further developed a few months later at Oxford, at the annual meeting of the British Association, when Dr. Lodge gave the first public demonstration of wireless telegraphy. In the amazing progress of subsequent years, when the subject was taken up on a commercial scale by Marconi, it was the *ELECTRICIAN* that once more championed a pioneer inventor. In the issue of September 17, 1897, an abstract of the Patent Specification granted that year to Marconi was followed by a note drawing attention to the earlier work in England.

"In connection with the patent of Signor Marconi," the Editor stated, "we are able to present our readers with two illustrations taken from photographs of some Hertzian-wave apparatus shown by Dr. Lodge at the Oxford meeting of the British Association in 1894. . . . In fact, Dr. Lodge published enough three years ago to enable the most simple-minded 'practician' to compound a system of practical telegraphy without deviating a single hair's-breadth from Lodgian methods. Both at Oxford and at the Royal Institution, Dr. Lodge described and exhibited publicly in operation a combination of sending and receiving apparatus constituting a system of telegraphy substantially the same as that now claimed in the patent we have referred to."

"It is reputed to be easy enough for a clever lawyer to drive a coach and four through an Act of Parliament. If this patent be upheld in the courts of law it will be seen that it is equally easy for an eminent patent-counsel to compile a valid patent from the publicly described and exhibited products of another man's brain. No longer is it necessary to devise even so much as 'a novel combination of old instrumentalities,' and the saying



Some of the apparatus used for the first wireless demonstration by Sir Oliver Lodge at Oxford in 1894, photographed by the ELECTRICIAN.

ex nihilo nihil fit evidently was not intended to apply to English patents at the end of the nineteenth century."

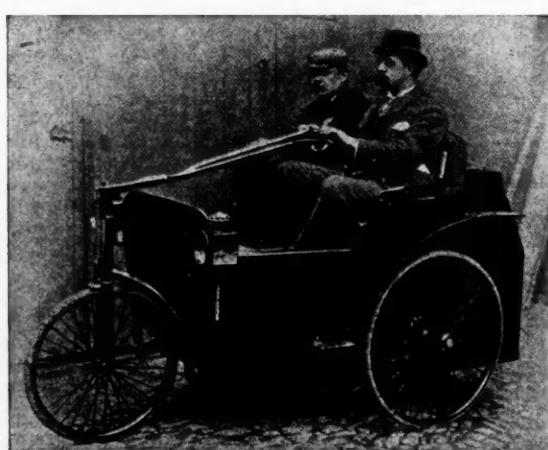
In reprinting these paragraphs it is not intended to revive the controversy that was settled by Marconi's acquisition of the Lodge patent in 1911. But the facts emphasise the important part played by the trade press in the story of scientific invention. The publication of technical research continues to be an important plank in the policy of the paper, which is now edited by Mr. G. H. Lepper and managed by Mr. R. D. Savage. Both men have had practical experience in the electrical industry, as well as in journalism. The Editor was for some years attached to telephone companies in the United States, and in South Africa, and served in the signals branch of the Royal Engineers during the War.

In a recent message of congratulation to the publishers, Mr. Thomas Edison said that notwithstanding the marvellous progress of the past half-century "we have only just stepped over the threshold and are entering into still more wonderful developments beyond the scope of prediction. The grateful thanks and appreciation of those interested are due to the *ELECTRICIAN* for the faithful service it has rendered during all these years, and I trust its days may be prolonged to record the ever onward progress of electrical science and industry."

Transport Problems.

As has been noted, the Electrician Publishing Company was also responsible for a second journal at the time when its interests were acquired by Benn Brothers. This was the *FRUIT GROWER*, which had been established in 1895 under the title of the *GREENGROCER, FRUITERER AND MARKET GARDENER*. The nearest approach to a periodical of this kind has been the *HORTICULTURAL TIMES*, which did not profess to be a trade journal in the full sense of the term and was closed down about the year 1891. In the trades embraced by the new journal there were "probably more persons employed than in any other group of businesses in the country." That this original claim was scarcely exaggerated is evident when it is remembered that the publication embraced commercial agriculture and all the interests, both wholesale and retail, concerned in the distribution of produce to the general public.

The *FRUIT GROWER* was not merely concerned with things as they were. It kept a shrewd lookout for beneficial innovations. In 1896, when motoring was in its infancy, the journal predicted the supreme value of motor transport, and published a series of articles on its application to agriculture. The development of long distance carriage brought into prominence the question of cold storage facilities on board ship. Again the details published in the technical press went far to develop this new transport from all parts of the world. The "compression" system of cooling now in general use was first applied commercially in 1880, when the *Strathleven* brought a small cargo of frozen meat to this country from Australia, but the transport of fruit raised entirely new problems. It was not until 1901 that the *Port Morant* brought her first cargo of cold stored bananas from the West Indies. As recently as 1922, about one quarter of the 2,000,000 cases of apples shipped from Australia reached England in a damaged condition. This experience was mainly responsible for the extensive study since made at the Low Temperature Research Station at Cambridge. The subsequent progress in this branch of industry is evident from the increasing range of overseas fruits that now find their way on to the British home market at all seasons of the year.



"New Machinery," 1896. With this title, the above picture of the new "horseless carriage" appeared in the BRITISH TRADE JOURNAL. Its maximum speed was 13 miles per hour.

The kind of advisory assistance which is now part of the Ministry of Agriculture's technical and educational scheme for promoting the interests and welfare of food production, had its origin in the advisory service established in the early days of the journal and is continued at the present time. Answers to correspondents in regard to horticultural and legal difficulties were supplemented by a pathological department, to which any grower who found his plants affected by disease could send specimens for examination. This service commenced with the appointment of Mr. W. F. Emptage as technical adviser, a position he retained until he assumed the general editorship. The success attending these efforts was so great that personal advice was requested from all parts of the United Kingdom. The visiting of markets was accordingly undertaken by Mr. W. Vestey, who has since become manager of the journal. It may be added that the staff in recent years has travelled abroad extensively, the countries visited including France, Holland, Belgium, Denmark, Algeria, Morocco and Spain.

War Food Campaign.

The Great War proved a searching time for the FRUIT GROWER, since the industries it serves were virtually nationalised. It continued to appear, however, and in 1917 on the death of its proprietor, Mr. W. Tucker, the journal passed into the hands of Benn Brothers. The new imprint was used on March 22, 1917, and a year later Mr. Herbert Wardle was appointed editor on Mr. Emptage's retirement. In February, 1918, when the need for increased home production of food-stuffs was an urgent problem, a Food Production Number was published, which comprised 104 pages and was by far the largest trade paper enterprise ever attempted, up to that time, on behalf of the fruit and vegetable industry. A letter of commendation was printed from the late Lord Rhondda, then Food Controller. On another occasion Mr. Lloyd George, as Prime Minister, contributed an autographed appeal for increased production, as part of the national food campaign.

Throughout its career the journal has taken every opportunity of advocating the better organisation of the industry. The London and Home Counties Retail Fruiterers' Association was first suggested by Mr. Vestey, and the scheme for its organisation drawn up in conjunction with Mr. Frank Mash. Later on, the formation of the Fruiterers' and Florists' Benevolent Fund was also initiated by Mr. Vestey, and with the valuable help of Mr. John Poupart was carried through successfully.

In 1920 the FRUIT GROWER published its first Empire Trade Number, anticipating by a year the first Imperial Fruit Show of 1921. An article on the three provincial shows urged that the reputation and prosperity of the industry would gain immensely by a national show. Since 1927 the paper has been even more closely identified with the Imperial Fruit Show by means of "Grower's Day," financed by the proprietors and originated by the enterprise of the editor. This annual function comprises two conferences and a luncheon, and has increased in importance in both aspects, the guests having grown in two years from 80 to 350.

To Bouvierie Street.

In the restricted conditions of personnel in 1917, a third publishing concern joined forces with Benn Brothers. This was John Allan & Co., the proprietors of the GAS WORLD. The offices of this old-established journal were located at 6-8, Bouvierie Street, where further space was available in the building owned by the NEWS OF THE WORLD. As the premises at Christopher Street were no longer large enough, Benn Brothers accordingly moved their original publications to this new address.

In thus introducing the trade and technical press into the heart of the newspaper area, it was anticipating by a few years the next big step, when the firm built its own premises on the most prominent site in Fleet Street. That belongs to a later part of this story but the remarkable rise in the status of the trade journal in recent years may be remarked here. Before the war the journalist's profession was generally regarded as among the least reputable—witness how in plays the reporter is made to vie in ridicule with the policeman. Among the members of the press themselves, the most humbly regarded were those connected with trade papers. Why such an attitude was adopted it is difficult to say, since those engaged in technical work deal with highly specialised matters, of more rather than less ultimate value to the community than much of the material in the daily press. Probably its origin was connected with the contempt, until comparatively recent years attached to everything to do with "trade," in contrast with professional occupa-

tions. However that may be, a significant change has come about since the War, and among the factors contributing to the improved status of the trade paper, Benn Brothers' move to Fleet Street may claim a predominant place.

A Pioneer Development.

A passage from the CABINET MAKER of April 7, 1917, shows that the move was consciously a pioneer development. Some opening notes on the associations of Fleet Street remarked that the histories written about it record many failures as well as brilliant successes. "We frankly confess that if we were newcomers to the newspaper world we should regard our entry into the Fleet Street area as a very risky adventure indeed at the present time. But as our readers know, the position is otherwise. . . . Development is the reason for our change of address. We hold the view that trade journalism of the future must of necessity be of greater importance and assistance to the trading community than it has been in the past, and no effort to this end will be spared by us at No. 8 Bouvierie Street. The developments noted above are naturally a source of strength. From the point of view of readers, the benefit accruing therefrom can hardly be calculated—a publishing house of such dimensions enjoys facilities which a single journal, working a lone furrow, cannot hope to obtain." The article might have added that the original trade papers of 1880, whatever may have been their quality from the trade point of view, cannot be considered as serious publishing propositions in the modern sense of the term.

Looking back on their history it will be noticed that they were in the control of men who, while able to claim some knowledge of the trade they were concerned with, knew for the most part nothing about the trade of publishing. Students of these matters may be a little puzzled on studying Benn Brothers' present list to notice that no two papers have very much in common from the trade point of view. The secret of the firm's success is that they recognised early the need for publishing knowledge as well as technical knowledge. They are primarily publishers and are thus able to put at the back of a trade paper the expert machinery of a large organisation. The technical excellence of the old paper remains, and is able to develop in a way which would be impossible without the strength of adequate publishing arrangements.

In the twelve years since Benn Brothers moved to Fleet Street, not only has trade journalism ceased to be regarded as the "poor relation" of the daily press but prominent figures in the latter field have actually abandoned it in favour of trade and technical publishing. For some time past the staff of Benn Brothers has been considerably strengthened in this way, and without naming particular instances, it may be safely asserted that certain leading editors who adopted this course have done so with advantage to themselves and to the firm they serve.

One of the latest recruits in this matter is the present deputy-chairman of Benn Brothers, Mr. Gordon Robbins, who resigned an important position on THE TIMES to take up his present occupation. The eldest son of Sir Alfred Robbins, he entered journalism on leaving the City of London School, and on his twenty-first birthday was already in charge of the Leeds office of the YORKSHIRE OBSERVER with four reporters under him. In 1906 a bigger opening occurred on the TRIBUNE and was soon followed by an appointment to THE TIMES, with which newspaper he was connected for over twenty years before joining Benn Brothers. During this period Mr. Robbins had a unique experience in all branches of this leading national newspaper and before he was appointed Day-Editor by Lord Northcliffe, he had worked side by side with his father as Lobby Correspondent in the House of Commons. The esteem in which he is held by everyone at Bouvierie House may be best expressed in the words of the Editor of THE TIMES, who in making a presentation to Mr. Robbins on behalf of his colleagues, said that Sir Ernest Benn was "wise and fortunate" in adding to his board a distinguished member of a distinguished Fleet Street family.

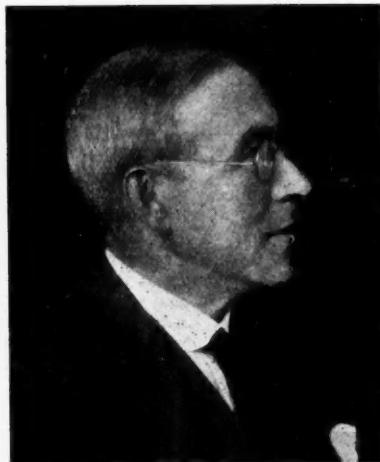
"The Gas World."

Without any great stretch of the imagination the GAS WORLD may be said to have originated in a little general printing shop in the Grassmarket, Edinburgh, beneath the shadow of Edinburgh Castle. From that little printing shop the late John Allan, the founder of the journal, issued in the 'seventies a little weekly called LIGHT, which dealt mainly with Scottish gas affairs. Perhaps Allan was attracted to the subject by his intimate friendship with William Young, for many years the

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A. R. PAIN.



E. G. BENN.



FLORENCE ROBINSON.



F. E. HAMER.



K. E. HUGHES.
(Ernest Benn, Ltd.)

Benn Brothers, Ltd., is fortunate in having a Board consisting entirely of working directors who give their whole time to the business. The third generation of Benns is now represented on the Board, which has set a precedent in Fleet Street by electing its first woman member.

grand old man of the Scottish gas industry, and to whose memory the North British Association of Gas Managers have founded an annual lecture. Perhaps, too, he found in it relaxation from the somewhat dreary work of reporting law cases in the Court of Session for a Scottish daily newspaper. The journal was short-lived but later Allan found an opportunity to embark upon gas journalism on a wider scale, and in 1884 he came to London and founded GAS AND WATER, the direct forerunner of the present-day GAS WORLD. Offices were taken in Crane Court, off Fleet Street, nearby the house of the Scottish Corporation. At one time it seemed likely that the staff would be obliged to fall back upon this charitable institution, but the storm was weathered, and eventually there developed a robust and growing journal. Gas and water were probably associated in the title because some companies supplied both materials, but after two years' existence it was decided to drop the latter and to devote exclusive attention to gas supply and gas uses. The title was then altered to its present form, and the GAS WORLD appeared. When Mr. Allan died in 1894 the journal was taken over by a private partnership, the principal partners being two of his journalistic friends, Mr. James Stewart and Mr. John Douglas, with whom was associated Mr. E. P. Haslam, a well known figure in the advertising world. At the beginning of 1917, John Allan & Co., as the proprietors continued to be styled, amalgamated with Benn Brothers.

Forty years ago trade and technical journalism was a somewhat stodgy and slow affair. If a meeting was held on a Wednesday, readers of any particular journal had often to wait until the next Saturday week for a report. If a conference extended over two or three days the reports in the trade journals took the form of a serial in a weekly paper, the only difference being that the break was not so abrupt as in the serial novel. Nevertheless, the method was equally tantalising. The reader interested in a big conference early in the summer did not get to the end of it until late in the autumn. The GAS WORLD started out to alter this. Perhaps it was the first trade journal to make use of telegraphy to report a meeting, as was done for the first number of what was then GAS AND WATER. On another occasion a full report of an important meeting held at noon on the Friday was on subscribers' breakfast tables on the Saturday morning. Judgment was given in the famous Welsbach patent cases on a Friday morning in 1896. The GAS WORLD had two special men in court. One man went straight from the court to the printers with one judgment, the second man followed with the second judgment, and the results appeared in that week's paper. That was pretty brisk weekly journalism in those days. For many years the paper has given full reports of three-day conferences, beginning on the Tuesday morning and ending on the Thursday afternoon, in the same week's issue published on Saturday. Whether the conference is held in London, Dublin, Belfast, Glasgow, or Aberdeen makes no difference.

Readers of the daily press will no doubt reflect that matters occurring on the other side of the world are reported the following morning, but this is not an accurate analogy. The staff of a weekly trade journal is in no way comparable in size with that of a daily newspaper, moreover the matters dealt with are invariably of technical character and demand expert knowledge in reporting. Proofs have often to be checked half-a-dozen times and in the case of gas reports there are invariably substantial sections of chemical formulae.

No one connected with the GAS WORLD did more to improve its service in these respects than the late Peter Robertson, who joined the staff in the 'eighties and edited the paper from 1918 to 1928. Starting his career in the offices of the GLASGOW HERALD, he eventually joined John Allan & Co. and remained in charge after the amalgamation. He was succeeded in the editorial chair by Mr. A. C. Slaughter, who ably carries on this tradition in co-operation with the manager, Mr. E. H. Hallows.

From its earliest days the GAS WORLD had devoted much space to chemistry. As the War progressed, the value of chemistry as a weapon in the struggle became increasingly realised. Many processes hitherto carried out in Germany had to be operated in this country and remarkable developments took place in the industrial applications of the science. It was not surprising that the need arose for a new trade journal to reflect this extended activity, nor that it should be promptly founded by the proprietors of the leading gas publication.

"The Chemical Age."

As soon as conditions allowed, not many months after the Armistice, the CHEMICAL AGE was started by Benn Brothers as "a weekly journal devoted to industrial and engineering chemistry." It was launched with the warm recommendations of eminent public men and scientists, among them the Rt. Hon. H. A. L. Fisher, Minister of Education, Lord Sydenham, President of the British Science Guild, Sir Edward Thorpe, and Lord Brotherton. The first number appeared on June 21, 1919, and on December 28, 1929, its Annual Review Number was the largest published in its history. The enterprise was a natural outcome of the immense debt that the nation owed to applied science in the final victory of the Allied Forces.

How successfully the original aims of less than eleven years ago have been realised may be judged from the bare mention of some principal achievements. Before the War Great Britain imported about 80 per cent. of its essential dyestuffs, mainly from Germany, and during the War the great textile industries found themselves suddenly deprived of the colours on which they depended. To-day the position is almost reversed. We import rather less than 20 per cent. of foreign dyestuffs and the remainder are manufactured in this country, providing, incidentally, a school of organic chemists and essential reserves should a similar time of national emergency unhappily recur. During the War, again, while we were laboriously and at a great risk and cost, shipping natural nitrate from Chile for the manufacture of fertilisers and explosives, Germany was obtaining her supplies of nitrogen from the air, by the synthetic process perfected by two of her great chemists, Drs. Bosch and Fritz Haber. To-day our country is producing ample supplies both for the home market and for the Empire, at the great works established by Imperial Chemical Industries at Billingham-on-Tees for the fixation of atmospheric nitrogen.



THE RT. HON. WEDGWOOD BENN,
D.S.O., M.P.
Secretary of State for India.

Chemical engineering, which a decade ago was little more than a name, is to-day a vigorous applied science, with a well-established Institution of Chemical Engineers, and an enormous field in the design and construction of chemical plant. In the same period our former dependence on Germany for scientific glassware and laboratory furnishings has been ended. In the important field of fine chemicals, British chemists have also made immense strides and British products are not only being produced in great variety but have already attained a reputation throughout the world for their standards of purity and dependability.

In the period covered by the comparatively short life of the CHEMICAL AGE, this industry has undergone an amazing transformation, in which the journal may claim to have played a notable part. Its history has demonstrated how a great publishing house, with its resources for news collection, for the instruction of public opinion and the stimulation of enterprise, may bring even into a difficult scientific field like chemistry the spirit and atmosphere of progress. The journal has not only interpreted chemistry to the public and helped to make the nation sensible of its debt to it; it has interpreted chemistry to chemists themselves and put new heart into them by emphasising the vital importance of their work. From the outset the paper has been edited by Mr. F. E. Hamer, now a director of Benn Brothers, who had a distinguished career in journalism before joining the company. Many years with the MANCHESTER

GUARDIAN culminated in his election in 1914 as President of the National Union of Journalists. During the War his assistance was constantly sought in press matters, one of his achievements being an important amendment of the Defence of the Realm Regulations. Mr. Hamer's mementoes of this active period include a telegram from the King and letters from King Albert and M. Poincaré. The manager of the CHEMICAL AGE is Mr. L. J. Moolenaar, who is steadily improving its position.

Since the science of chemistry is international, its industrial applications are largely international also. The journal has become an international centre for enquiries from points as far distant as Leningrad, the Malay States, India, Australia, South Africa, and especially Canada and the United States.

The international character of the Benn journals generally, is largely due to Sir Ernest Benn's policy, not merely of traveling widely himself, but of enabling editors, advertisement managers and heads of departments to refresh their minds and methods by periodical visits to overseas countries. His eldest son, Mr. John Benn, was a student for some time at Princeton University, where he studied chemistry before joining the firm. His second son, Mr. Glanville Benn, gained an inside knowledge of American newspaper ways on the staff of the NEW YORK TIMES, and visits to Canada have made him acquainted at first hand with Canadian publishing enterprise. Mr. F. E. Hamer, attending the annual convention in New York of the Associated Business Newspapers of America, has met personally the leading representatives of the American trade and technical press, and learnt all that a visitor can learn of the amazing enterprises of American firms.

The result is that the firm of Benn Brothers and its publications are known to publishing and newspaper firms throughout the vast continent of the States and the great Dominion of Canada almost as well as their own firms and productions. Both sides benefit from this close international contact. They both learn the best that their overseas rivals can teach, and readers and advertisers get the benefit of this vast organisation. Beyond all this, there is the broad national advantage of a mutual understanding of conditions and of personal friendships, which help to safeguard the good relations essential to the peace of the world.

"Ways and Means."

Another publishing enterprise that was the outcome of the War was not so successful. WAYS AND MEANS appeared a few months after the Armistice as a weekly review of industry, commerce and social progress, and was conducted somewhat on the lines of the SPECTATOR. It was not strictly speaking a trade journal, but in so far as its interests were common to the business community at large, the publishers felt the enterprise to be justified. More than a decade after the events it is difficult to recall the atmosphere of uncertainty which prevailed, while vast industries like iron and steel were endeavouring to readjust themselves to peace-time requirements, and other trades were still in process of denationalisation. Thousands of men were being demobilised and had again to be absorbed in business. Mr. Ernest Benn was at the time an active member of the Ministry of Reconstruction and while enthusiastic in its work was among the first to recognise the limitations of the bureaucracy, with which nearly every department of the national life was still surrounded.

The new weekly was issued on March 8, 1919, under his personal editorship, assisted by Mr. Henderson Pringle (now Principal of the Birmingham Commercial College). The atmosphere of hope that prevailed after the enormous struggle of the previous five years was reflected in the opening pages. "WAYS AND MEANS," we read, "starts its career at the beginning of a new era; it will be working on new ground; its purpose is to establish a new point of view. It aims at being the organ of industry and it makes its appeal to the great public, a bold and exceptional thing to do and one which a few years ago would have been regarded as entirely impossible. . . The universal demand is for an improvement in the standard of living and that demand can only be satisfied by industry. The man who produces a few tons of rubber or leather or jam is doing far more to 'win the peace' than the government that establishes a Ministry of Something, or the inventor of another pension or dole panacea which accentuates instead of removing a bit of need." In the same article the editor admitted that the journal was in the nature of an experiment, which might not succeed for many years to come. As events turned out, only three volumes of WAYS AND MEANS were published, yet in the paragraph just quoted there was a prescience which was truly remarkable. Without entering here into the controversies of

Some Jubilee Dates.

- 1861. John Williams Benn an office boy in Mincing Lane.
- 1868. Draughtsman to a furnishing firm at 20s. a week.
- 1880. First issue of the CABINET MAKER, published monthly from 5 Finsbury Square.
- 1885. "J. W. Benn & Brothers"—John, Julius, Davis and Henry—move to 42 City Road.
- 1889. J. W. Benn elected original member of London County Council.
- 1891. Ernest J. P. Benn enters the business.
- 1892. John Williams Benn enters Parliament for St. George's-in-the-East.
- 1897. Establishment of THE HOUSE.
- 1899. HARDWARE TRADE JOURNAL purchased.
- 1900. IRONMONGERY incorporated with the HARDWARE TRADE JOURNAL.
- 1903. Wedgwood Benn edits the CABINET MAKER.
- 1904. John Williams Benn Chairman of the London County Council.
- 1905. Receives the honour of knighthood.
- 1906. Benn Brothers move to Christopher Street. New offices opened by Lord Monkswell. Wedgwood Benn leaves business to become M.P. for his father's first seat.
- 1907. EXPORT WORLD founded.
EL COMERCIALE ARGENTINO (published in Spanish in Buenos Ayres) founded.
- 1910. Sir John Benn visits South America as guest of the Argentine Government.
- 1914. Sir John Benn created a Baronet.
- 1915. Oliver Benn killed in Gallipoli.
- 1917. ELECTRICIAN and FRUIT GROWER acquired.
Move to Bouverie Street.
GAS WORLD purchased.
- 1919. CHEMICAL AGE founded.
Acquisition of GARDENING ILLUSTRATED.
- 1919-24. WAYS AND MEANS and EUROPEAN COMMERCIAL published as journals of post-war reconstruction.
- 1921. Book Department founded for the publication of technical books.
First issue of SPACE.
- 1922. Death of Sir John Benn, "Father" of the L.C.C.
- 1923. Ernest Benn, Ltd., incorporated.
- 1924. DISCOVERY added to list of publications.
- 1925. William Rider & Son, publishers of TIMBER TRADES JOURNAL, taken over.
- 1926. Move to Bouverie House, Fleet Street.
Third generation joins the Board; Mr. John A. Benn elected a Director.
- 1927. John Benn Hostel for working boys opened by the Prince of Wales.
Mr. Gordon Robbins resigns Day Editorship of THE TIMES to become Deputy-Chairman of Benn Brothers.
NURSERY WORLD purchased.
- 1929. Wedgwood Benn becomes Secretary of State for India.
BRITISH TRADE JOURNAL, MILLER and LEATHER TRADES REVIEW acquired.

politics, its conclusion may be emphasised ten years later, when a Minister of the Labour Government has been obliged to admit that there is no magic cure for the revival of trade.

But WAYS AND MEANS did not confine itself to criticism. Its pages were crammed with constructive proposals in regard to every aspect of industry. Perhaps its failure was accounted for by making too wide an appeal. The early issues contained contributions from the Rt. Hon. J. H. Whiteley, who explained the Industrial Councils which were then being set up in the leading industries of the country, and were soon to exercise a profound influence in the cause of industrial peace. Benn Brothers were closely allied with the movement and through their trade journals also took an active part in promoting this new instrument in industry. Another writer was Mr. J. R. Clynes, the present Home Secretary, who took as his subject the responsibility of trade unions.

National Service.

Only in perspective can any period be accurately judged, and it is still not generally realised how perilous the situation was in 1919. Apart from the vast problems of reconstruction, the natural tendency to reaction from the efforts and strain of war had to be combated. WAYS AND MEANS not only forms a permanent record of this period but at the time it undoubtedly performed an important national service. If its sphere of influence was limited, the journal attracted considerable attention among the leaders of industry and those engaged in all ranks of trade and commerce. It was to the forefront in supporting every movement to promote the better relations of employers and employed—work that was to bear full fruit during the succession of strikes and lock-outs shortly after the "boom" period, which were singularly free from the bitterness characteristic of earlier struggles.

Having started WAYS AND MEANS to deal with the problems of industrial reorganisation at home, Benn Brothers soon followed this with a similar effort on an international scale. This was known as the EUROPEAN COMMERCIAL and was published in Vienna from the autumn of 1922 till early in 1924. The first years of peace had seen a succession of conferences on reparations, with indifferent results owing to the political animosity that still prevailed. Leaders of business were beginning to realise that international settlement did not demand further elaborate machinery, so much as mutual trust and good will. "The new spirit of to-day," said the EUROPEAN COMMERCIAL, "demands that more definite steps be taken to ensure that, free from bias toward any country whatsoever, and honestly in the interests of Europe as a whole, facts regarding the commercial and economic position of the various business centres of Europe should be made available to all concerned." The first number published reports from its own representatives in Brussels, Sofia, Prague, Copenhagen, Amsterdam, Budapest, Trieste, Warsaw, Constantinople, Bucharest, Stockholm—and even Moscow—besides from London, Paris and Berlin, and it met with enthusiastic approval in all countries. The British Prime Minister sent his congratulations on the enterprise, as did the leaders of commerce throughout the Continent.

Apart from its mission of reconstruction, the new journal was following a tradition already established by Benn Brothers, such as EL COMERCIANTE, for promoting British trade abroad. It was therefore of direct value to the publishing business as a whole. The circulation on the Continent which the trade journals enjoyed before the War was slowly being recovered, and the EUROPEAN COMMERCIAL was in the nature of a traveller for every Benn publication. More important still, its representatives in every large centre provided an organisation covering the whole of Europe, for the provision of facts required

by the journals issued in London. The English staff in Vienna numbered six, and was strengthened by four Austrian journalists and experts. The Editor was Mr. T. Mortimore Sparks, who for some time had been financial editor of the SHEFFIELD TELEGRAPH before joining Benn Brothers to conduct the HARDWARE TRADE JOURNAL. Shortly afterwards he was selected by Sir Ernest for Vienna, when he also visited the principal European capitals. The manager of the new enterprise was Mr. F. Kirby, who had joined the firm many years previously when VANITY FAIR ceased publication.

Readers will remember the rent restriction measures to which Vienna was subject at this time. One effect was that the new journal occupied a magnificent office in the Hohenstaufengasse, which seemed like a palace to the London staff who had been sent out to run the enterprise. The building was situated in the banking quarter of the city, with frontages on two streets. The printing arrangements were complicated by the fact that the compositors did not understand English, and every line of copy had thus to be typewritten. But the work was carried out in premises described by visitors as "the finest of its class that we have seen anywhere in the world." In spite of strikes and uncertainty, Vienna was already putting itself in the forefront as regards industrial welfare—work that was assisted by the depreciated currency. "A typical staff restaurant, not very far from our offices, serves 850 dinners every day, from beautiful modern kitchens, attached to a sort of roof-garden restaurant of the most attractive description. A plate of meat, vegetables and a sweet are daintily served to this vast army of employees, at the price of 5,000 crowns, or the equivalent of about 3½d. each."

When figures like these are quoted, it is not surprising to learn that the EUROPEAN COMMERCIAL had to be abandoned in 1924, largely owing to the unstable conditions that continued to prevail. But in the history of journalism and the "post-war period" the enterprise was unique and the publishers look back on it with nothing but pride. The connections formed on the Continent have proved of lasting value.

It has been convenient to describe the activities of the War and its outcome in a consecutive story. We must now consider other landmarks in the period. The first of these unhappily was the death in 1919 of Mr. Julius Benn, the first partner in the firm which for fifty years has been able to justify literally its designation as "Benn Brothers."

One of his early successes was in the production of furniture trade catalogues. In the days when the arts of advertising were not so highly developed as they now are, Julius Benn was responsible for the production of the largest volumes that had, up to that time, appeared. Notable among these was the Whiteley catalogue, which he personally arranged for many years in succession. His reputation spread overseas, and he was entrusted with the issuing of an important periodical for a firm in Cape Town, a commission which he held until his retirement from business. When in 1889 his elder brother entered political life, Julius became the senior director of the firm.

Until the day of his death he was always proud of his ability to take a shorthand note, having been one of the first to learn the Pitman system. Julius used this shorthand in social work, and for forty years held regular classes in connection with men's clubs, where he trained hundreds of pupils. For neatness and accuracy his own hand was unsurpassed, and there must be many people still working in the City to-day who owe their skill to his training. If an explanation were needed for this philanthropy, it would be found in the deep-seated love of his fellows that was characteristic of the man. Like Sir John, moreover, he never forgot his early struggles and throughout life it was to helping others to



THE LATE SIR JOHN BENN.
From the portrait by Sir William Orpen.

rise from the ranks that Julius devoted his leisure and skill, "Mr. Julius was in a sense the father confessor to many in the trade," said a memoir writer in the CABINET MAKER. "If it was a question of partnership or a financial rearrangement, or the development of a new department at home or overseas, or even of the engagement of a manager or traveller, they would seek his advice and assistance. The measure of his success in obtaining the confidence and affection of his contemporaries is in no way better shown than in the fact that it was the exception to add the word Benn to Mr. Julius."

A Business Romance.

In the two years after the move to Bouvierie Street the facilities of Benn Brothers for dealing with a group of publications had steadily improved, but the firm had confined its activities to trade journalism. A departure from this policy now occurred, in 1919, when two papers having a popular as well as a technical appeal were acquired—**GARDENING ILLUSTRATED** and **FARM AND HOME**. The latter dealt with agriculture from the standpoint of the small farm-owner, but mainly owing to an endeavour to cover interests that were too ambitious for a single paper, it had to be discontinued. By contrast with this failure, **GARDENING ILLUSTRATED** was a romantic success.

"My horticultural guide, philosopher and friend," was how Sir Rider Haggard described GARDENING ILLUSTRATED, a tribute typical of the affection in which this paper is held by the more advanced amateur and professional gardeners. As the first penny gardening journal, it had instantly achieved a memorable success. William Robinson, its founder and first editor—the author of "The English Flower Garden," "The Vegetable Garden" and other horticultural classics—discovered that there was a big public waiting for an attractive paper at a popular price, and in the short space of nine months after its foundation on March 15, 1879, this new weekly acquired a very large circulation. The newsagents described it as "the penny startler," so sensational was its success. On the personal side the enterprise was not less romantic. Robinson had started life as a garden boy, and in the course of time was to purchase Gravetye Manor, a grand Elizabethan mansion in the heart of Sussex, where he is now living in retirement in his ninety-fourth year. Not that he regards himself as an old man; he looks forward with confidence to his hundredth birthday, and is meanwhile making plans for the further development of the gardens. The Gravetye Manor Estate comprises many hundreds of acres, including some of the finest timber in the county, and is a source of joy every year to thousands of visitors from all parts of the world.

From the outset Robinson's enterprise attracted the support of the biggest gardening celebrities. Dean Hole, Gertrude Jekyll, Peter Barr, and many others dipped their pens assiduously for him in propaganda for the betterment of English gardens. The paper's practical features, experienced writers, and unique illustrations gave it a foremost place in amateur gardening journalism, and even the professionals welcomed it as a paper they could make their own. Early readers will also remember the colour plates by Moon, which no gardening paper has ever surpassed in standard. The editorial policy has been consistent, and the founder's right-hand man and disciple, William Thomson, who succeeded him as editor in 1893, faithfully carried on the Robinson traditions until he died in 1927 after forty years' prodigious service to the paper. He was awarded the Veitch Memorial Gold Medal in 1926 for his contributions to horticultural journalism. The present editor, Mr. H. Cowley, widely known as a plant-hunter, is a popular figure in gardening circles, as also is the manager, Mr. H. W. Duck.

We are dealing with events in chronological order and the next to be noted is the presentation to Sir John Benn which was made by the staff on his seventieth birthday (November, 1920). A book containing over two hundred names conveyed the congratulations of those to whom the "Chairman" was a familiar figure. Since his entry into public life, Sir John had remained a frequent visitor to the office. Every year he made a point of handing the Christmas bonus personally to each member of the staff. His renewed activity during the war period brought him into further touch with Bouvierie Street. On his seventieth birthday it had been intended to hold a complimentary luncheon, to commemorate his thirty-two years of consecutive service on the London County Council, but Sir John's health at the time made it impossible to proceed with the idea.

The function accordingly took place in the following spring, in April, 1921, when the Marquis of Lincolnshire presided over a large company of business and political acquaintances gathered to honour the "Father" of the L.C.C. A telegram was received from Lord Stamfordham stating that His Majesty was "interested and pleased to hear of this recognition of Sir John Benn by his friends and admirers for his long service in the government of London."

Proposing the chief toast, the chairman said that although there were many present at the luncheon who could look back a long time, Sir John Benn was the only original member of the L.C.C. who was now a member. In reply Sir John said that the question would naturally be asked: "What did these people do for London?" The Council (he stated) was preceded by the Metropolitan Board of Works, which left them a glorious legacy in the shape of the Thames Embankment.

What memorials had the old L.C.C. left? Sir John continued. "One of the most important was the Strand improvement. In the early days it was one of the most disgraceful slum areas in London, but it had been removed and the most remarkable transformation scene in any city in the world had been effected. A rateable value of £92,000 had already become one of £117,000, and when all the buildings were up it would reach £360,000. When the whole scheme was completed the ratepayers would possess one of the greatest municipal assets in the world." He referred with pride to what the Council had accomplished for the health of London, the reduction of the death

SIR ERNEST BENN, BART.
From the portrait by Sir William Orpen.



London, the reduction of the death rate, the provision of tramway services and housing schemes. On the latter they had spent nearly £300,000 and these were paying their way on economic rents. Many acres were added to the parks, and the amusements of the Metropolis had been purified and made more popular by their wholesome policy. "The record of the L.C.C.," Sir John claimed, "would bear examination and was a source of justifiable pride. Those present should preserve as a precious heritage the ideals of those early days."

The Joy of Work.

In the following spring (1922) Sir John contested yet another election and was returned again for Kennington. Side by side with his work on the L.C.C. he had in earlier years been a Member of Parliament. At the 1892 election he gained St. George's-in-the-East for the Liberal cause, defeating the Conservative candidate, Mr. C. T. Ritchie, by 398 votes. The victory set up a record in the election, as Mr. Ritchie was President of the Local Government Board and was the only Cabinet Minister to suffer defeat—and that at the hands of a newcomer among aspirants for Parliamentary honours. During his membership of the House of Commons Sir John Benn consistently fought for the cause that he had supremely at heart—the new and brighter London. He was defeated at the

1895 election and two years later contested the Dartford by-election. He was again unsuccessful at Bermondsey in the "Khaki Election" of 1900, but in another by-election he provided in 1904 a foretaste of the great landslide of 1906, by winning Devonport with a majority of 5,179. He easily retained his seat in 1906, but lost it in 1910 by 140 votes. Thenceforward he confined his efforts to municipal government.

Commenting on the 1922 election result a writer in SPACE took the opportunity to discuss the Joy of Work, and the latest example of the unceasing effort of Benn Brothers' Chairman. "The man who started in the City as an office boy at the tender age of eleven and who can fight a strenuously contested election in his seventy-second year, is made of the real stuff—the stuff that success is composed of, the stuff which is essential to every live newspaper enterprise. Sixty-one years of unceasing effort in journalism and politics is more than most of us will achieve; but it does give to all of us an example to live up to. Our Chairman has for three or four years past been under something of a cloud. The serious illness which attacked him in the middle of the War robbed us of the active young man that he was up to sixty-eight—for there surely never was a younger sixty-eight. The County Council election, with its canvassing, its meetings and all its strenuous effort, is delightful proof that the effects of the illness are passing and that being so, there is no telling what new standards of effort our rejuvenated chief may not be setting for us."

But the fulfilment of these hopes was a brief one, for a month later Sir John was taken suddenly ill at his home at Limpfield. In April, 1922, he died after ten days' struggle to regain consciousness. He had always been a fighter and those of his family who watched his last brave struggle for life could only conclude that the end was a fitting close to his career. Sir John had died in harness, for two days before his illness he was actively engaged in Council matters and on the same morning had played his accustomed round of golf.

Business and Politics.

Although for twenty years Sir John had devoted the greater part of his time to public work, he had never ceased to be a business man, and yet so admirably and truly was he able to balance matters that there was no confusion or connection between his public and his private work. Sir John was immensely proud of his business and particularly of the developments which he lived to see in the last years of his life. At the same time he never tried to disguise the fact that he regarded it as a stepping-stone to public life; once it was established and others had been trained to carry it on, he soon gave his major attention to the London County Council. As Mr. T. P. O'Connor said in a Memoir in the DAILY TELEGRAPH, most of Sir John's public and political associates were unaware of his business activities. It was, of course, impossible to keep his business associates in ignorance of his public life, and not a few of them followed his fortunes with interest and personal assistance, for example, in election work. But a simple illustration of the consistent line which he followed in these matters may be found in the fact that in the early days of the London County Council he declined to allow any of the official announcements of that body to appear as advertisements in his paper.

The question soon arose as to what form a memorial to Sir John Benn might most fittingly take. While his name will be remembered most widely on account of political activities, he was also the founder of an important business, and something commemorating both aspects of his career was desirable. The solution of the question came in 1924, when Mr. J. J. Mallon, Warden of Toynbee Hall, obtained an option to purchase the Barnardo Building in Stepney. The proposal was brought to Sir Ernest Benn that he should take this over as a hostel for working boys—in the district where John Benn had rendered much political service and where he had lived as an "office boy" himself in 1860. With the aid of the Carnegie Trustees and subscriptions from many friends, Sir Ernest bought the freehold and work was put in hand to make the building suitable for a resident hostel for boys. In 1927 the Prince of Wales honoured this new activity by opening the "John Benn Hostel," which provides a home in every sense of the word for about eighty boys between the ages of 14 and 18, who have no home or parents of their own, or who are "on probation" as first offenders.

Of the cost of running this valuable institution, which is entirely dependent on voluntary support, the boys themselves contribute £2,000 a year towards the budget of £6,000. No better tribute to its success can be mentioned than that the Prince felt justified in visiting the Hostel again in 1928, thus maintaining the personal interest in its work which had prompted His Royal Highness to perform the opening ceremony.

Book Publishing.

Among the romances of post-war business must be numbered the rapid rise to prominence of the book publishing company formed by Sir Ernest Benn in 1923. For some years a series of technical books had been issued by Benn Brothers, later a series of volumes on Ceramics and Oriental Art was added, and the rapid growth of this department made it advisable to launch it as a separate organisation. In less than seven years, all classes of production have been successfully undertaken, from art books priced in many guineas at one extreme to the famous Sixpenny Library at the other, with works of biography, fiction, history and *belles lettres* in between. Factors which led to the creation of a separate company included organisation and finance, in which there are considerable differences between a journal and a book. The one is produced and published in seven days, the other may involve work extending over many months and even years.

Ernest Benn, Limited, arose out of Benn Brothers and the closest co-operation has continued to exist between the two companies. The CABINET MAKER, for example, was the parent of Mr. H. P. Shapland's classic work on "The Practical Decoration of Furniture," while from its earliest days the ELECTRICIAN had published many standard volumes, notably Heaviside's monumental "Electromagnetic Theory." The TIMBER TRADES JOURNAL, again, had built up a library of books like "Shipping Marks on Timber" and the "Zebra Code," which are known and used by the timber industries the world over. These several series were brought together and enlarged by Ernest Benn, Ltd., and other departments of technology developed, always with the idea of providing expert help for those engaged in the leading industries. Thus the chemical engineering list includes Stanley Green's "Industrial Catalysis." Under the heading of mining and metallurgy is Mr. Clements' great work on "Blast Furnace Practice." Agriculture, horticulture and fruit growing form another important section of the scientific list, which besides technology comprises important books on pure science, like Sir Oliver Lodge's "Atoms and Rays."

Before the end of their first year's trading, Ernest Benn, Ltd., had taken a full-page advertisement in THE TIMES, the first space of the size to be reserved in this newspaper by any publisher. A dominant position had been reached in a field where the Continental art publishers were previously unchallenged. Art books demand the most skilled typography obtainable and the closest attention to the pictorial aspects of production—the selection of originals suitable for the block-maker, the process to be employed, the passing of the proofs (sometimes requiring six operations), the choice of paper and ink. All these factors are vital to success. Ernest Benn, Ltd., was fortunate in having from the outset the services of Mr. C. E. Hughes, a director of the older company, and the author of several books on painting. For many years he had collected and studied pictures, and was recognised as an authority on water-colour. Mr. Hughes was therefore already *persona grata* with the officials of the principal art galleries and museums, before the new business made their co-operation invaluable. It is no secret among his colleagues that the art books owe their success on the production side to his unusual qualifications.

"The Eumorfopoulos Catalogue."

To name the art books issued by Ernest Benn would require several columns. Highly specialised subjects like Mediæval Wall Painting have appeared in the firm's list, but perhaps the most notable contribution to the permanent literature of art is the "Catalogue of the George Eumorfopoulos Collection." It is generally agreed among orientalists that the collection owned by Mr. George Eumorfopoulos, the doyen of the Greek community in London, is the most wonderful of its kind in the world. Pictures, sculpture, jewellery, metalwork, jade, glass and ceramics comprise the principal departments, in which every branch of Chinese art is represented by material of the first importance. The volumes which Ernest Benn have undertaken now number fourteen. The initial series was devoted to Ceramics, and the services of Mr. R. L. Hobson of the British Museum were enlisted as editor. A scholarly introduction to each volume is followed by ample coloured plates of the finest specimens, with illustrations of others in collotype. Nothing of importance is omitted, and by turning its pages the reader can view practically the whole collection, besides reading a description of every piece. Ceramics was followed by other volumes on paintings, bronzes, jades and sculptures, and the Catalogue, now nearing completion, is agreed to be the most sumptuous publication on Chinese art ever issued in any country.

By a happy coincidence one of the first volumes of a general character which the firm produced was Mr. A. G. Gardiner's

EDITORS OF BENN BROTHERS' JOURNALS.



E. W. GREGORY.
"The Cabinet Maker."



N. FRENCH.
"The Hardware Trade Journal."



G. H. LEPPER.
"The Electrician."



A. C. SLAUGHTER.
"The Gas World."



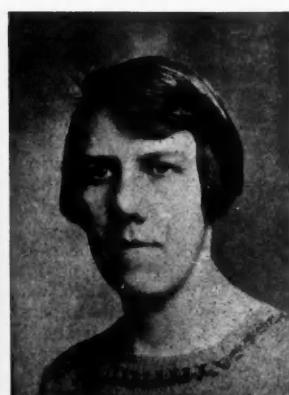
H. H. WARDLE.
"The Fruit Grower."



H. COWLEY.
"Gardening Illustrated."



T. M. SPARKS.
"The Timber Trades Journal."



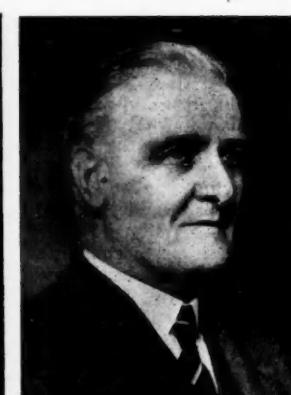
M. S. CODY.
"The Nursery World."



A. R. EDGE.
"The British Trade Journal."



E. HEUNER.
"The British Trade Journal."

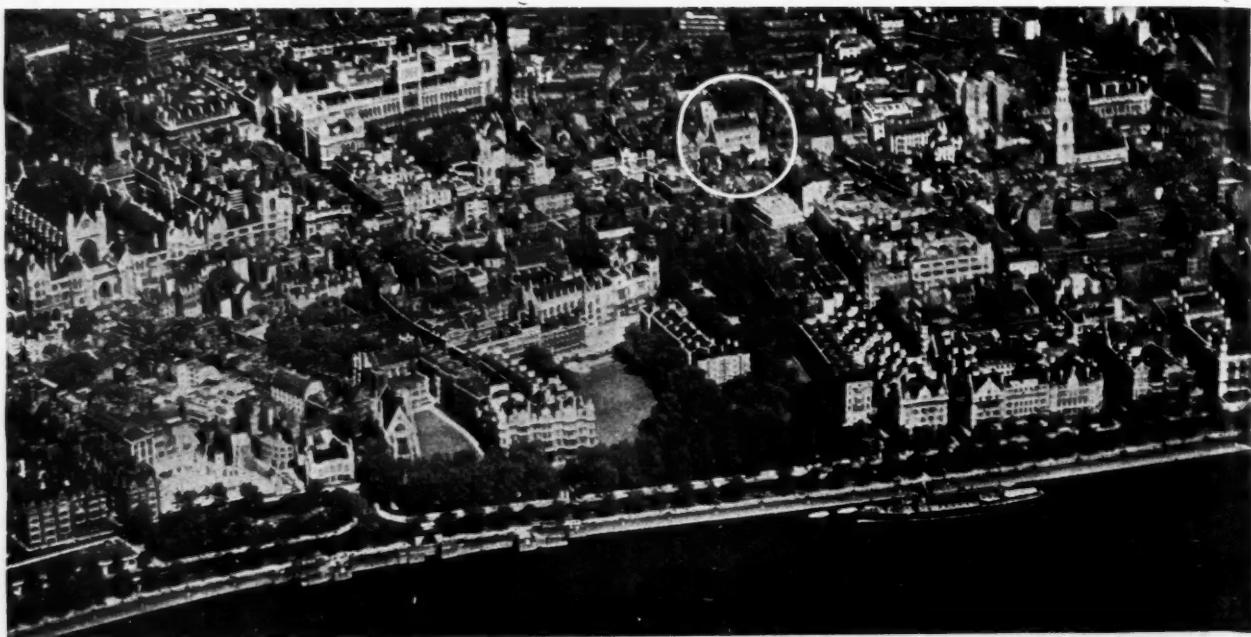


J. C. HARRINGTON.
"The Leather Trades Review."



H. G. CATCHPOOL.
"The Miller."

Other editors of Benn Brothers' journals are F. E. HAMER (*THE CHEMICAL AGE*) and J. A. BENN (*DISCOVERY*), who are directors of the company. About two thousand inquiries and technical problems are dealt with every week by this team of journalists.



Bouverie House, Fleet Street, photographed from the air.

Aeroflms

Biography of Sir John Benn. Apart from giving a full account of the early activities of the founder of the firm, this book made an important contribution to contemporary history. The title was "John Benn and the Progressive Movement," and in its pages the story of the London County Council was told for the first time.

The book which may be said to have established the reputation of Ernest Benn, Limited, as publishers of biography was, however, published in 1926, when the first two volumes of the now famous "Intimate Papers of Colonel House" appeared. Since then many important biographies and memoirs have been offered to Ernest Benn, Limited, and of the subsequent publications may be mentioned the "Life of Lord Curzon," by Lord Ronaldshay (now Marquis of Zetland), "The Memoirs of Mr. T. P. O'Connor," and "The Letters of Gertrude Bell."

In addition to Sir Ernest Benn, the directors of the company are Mr. Gordon Robbins (vice-chairman), Mr. C. E. Hughes, Mr. J. A. Benn, Mr. E. G. Benn (general manager), and Mr. K. E. Hughes. The sales manager is Mr. G. Gilman, and the technical book department is in charge of Mr. L. P. Shapland and Mr. E. G. Hawke.

The next addition to Benn Brothers' list in 1924 was the journal known as *DISCOVERY*. Founded in 1920 and first published by Mr. John Murray, this "popular journal of knowledge" was established under a Trust, of which the present members are Sir J. J. Thomson, the Master of Trinity College, Cambridge; Sir Frederic Kenyon, director of the British Museum; Professor A. C. Seward (Cambridge), and Professor R. S. Conway (Manchester). To safeguard the editorial policy and to secure the co-operation of expert writers, a committee representing the principal learned societies and scholastic associations was formed, and from the outset has met twice yearly to promote the interests of the enterprise.

Perhaps the most spectacular of the discoveries so far published in its columns was the achievement of television, first announced by the inventor in the issue of April, 1925. At that time Mr. John Baird was transmitting outline images on an apparatus that the editor described as "astonishingly crude." The optical system was composed of bicycle lamp lenses and the framework could only be termed "an unimpressive erection of old sugar boxes." When the Editor (at that time Major Pollard) was asked to inspect the new invention, it had just been placed on view by Messrs. Selfridge's at their Oxford Street premises. The scope for television had long been recognised as enormous, but it needed great courage to predict early success for the Baird method. Nothing more than shadow outlines could be transmitted and the inventor lacked any financial support. Major Pollard foresaw the possibilities of the apparatus, which less than five years later sufficiently developed to justify an experimental service through the B.B.C. station. Since 1926 *DISCOVERY* has been edited by

Mr. J. A. Benn, and the manager is now Mr. G. P. Grieve.

The popular papers in Benn Brothers' list were augmented in 1927 by another entitled the *NURSERY WORLD*. This weekly periodical had been founded in 1925 by Messrs. Faber & Gwyer, to meet the problems of mothers and nurses but in less technical terms than the professional papers; at the same time there were pages of recreational interest. The staff was enlisted from the ranks of trained nurses and a principal feature was the enquiry bureau, to give readers free advice on all matters of child welfare. By June, 1927, it became obvious that a larger publishing organisation was required to maintain the paper, and the copyright was sold to Benn Brothers. At that time its advertisement pages numbered only one-sixth of the contents. The subsequent improvement, under Mr. Washington Flatt's management, has been such that about one-half of each issue is now devoted to advertisements. The editor is Miss Cody.

"The Timber Trades Journal."

The next trade journal to come to Bouverie Street was bought in 1925, when the old-established business of William Rider and Son was amalgamated with Benn Brothers. The *TIMBER TRADES JOURNAL* had been founded in 1873, and was issued from Bartholomew Close where J. & W. Rider, as the proprietors were styled at the time, had carried on a printing business for more than a hundred years. During the first half of the nineteenth century all imported timber was dutiable with a tariff in favour of the Colonies; the importing business was in the hands of a few firms who conducted it on very conservative lines. The outlay attaching to the payment of the duty and the necessity of passing the entries before the delivery of the goods prevented the small buyer from meddling with the import trade, to the advantage of the large merchant. Not until the abolition of the duty in 1866 did appreciable expansion occur; the free importation of Scandinavian wood then brought about great developments, which continued apace until the Franco-Prussian War of 1870. For the next few years the timber market positively boomed, in common with the trade generally in Europe. In 1873—when the *TIMBER TRADES JOURNAL* was founded—the softwood timber imported was alone estimated at £17,000,000, an increase of five millions over the preceding year. Free Trade in wood had increased the number of firms engaged in the business and new methods were being introduced. At this transitional period the need was felt for a trade paper as an independent medium between exporters, importers, and merchants. The first volume was scarcely concluded when the trade reaction of 1874 occurred, making the continuance of the journal no easy task.

At the outset, in the early seventies, much of the timber trade of the metropolis was concentrated above London Bridge, on the south bank of the river. Half of the population of Lambeth is said to have been employed in this work; wharves

MANAGERS OF BENN BROTHERS' JOURNALS.



J. A. KNIVETT.
"The Hardware Trade Journal."
(London Manager.)



W. VESTEY.
"The Fruit Grower."



R. L. WEBB.
"The Timber Trades Journal."



H. W. DUCK.
"Gardening Illustrated."



E. H. HALLOWS.
"The Gas World."



L. J. MOOLELAAR.
"The Chemical Age."



R. D. SAVAGE.
"The Electrician."



F. WASHINGTON FLATT.
"The Nursery World."



N. B. MELLOR.
"The Cabinet Maker."



J. V. F. BUCKINGHAM.
"The British Trade Journal."



J. H. WATERFALL.
"Miller" and
"Leather Trades Review."



G. P. GRIEVE.
"Discovery."

The manager of THE HARDWARE TRADE JOURNAL is E. E. STARKE, a director of Benn Brothers, Ltd. Certain of the Benn journals publish more than five thousand pages of advertisements each in the course of the year.

were numerous and extended at intervals from Blackfriars to Stansgate in Essex. At that time shipbuilding had not finally left the Thames, house-building was going ahead rapidly in all the outer suburbs, and the timber trade shared in the general prosperity. Most of the wood coming to London was disposed of to merchants who possessed waterside premises, on the river or canals, and provincial firms filled their requirements from London stocks. Gradually a new element entered the trade, when certain merchants moved to offices in the City. In the course of time the Surrey Commercial Docks, where shedding accommodation was provided, became the timber yard of the City firms.

The predominant importance of overseas trade in timber was recognised from the start, and representatives of the journal have paid regular visits to the Scandinavian countries, to Russia and to the United States. The most recent tour was made by Sir Ernest Benn in 1929 to the Baltic States, where he lectured extensively before the Chambers of Commerce and other business organisations. Perhaps the most vigorous traveller on behalf of the enterprise was Mr. Edwin Haynes, who almost from the beginning had guided its destinies. His early adventures included being among the few English people to escape from Paris just before the siege by the Prussians, and he soon became an equally popular figure with the timber traders abroad, as among his colleagues in this country. It was, indeed, to the unfailing energy of Mr. Haynes during more than fifty years' service as editor and director that the *TIMBER TRADES JOURNAL* owed its strong position in 1925, when Benn Brothers acquired the business. Soon after the amalgamation the editorship was taken over by Mr. T. Mortimore Sparks. Like Mr. Roland Webb, who has ably managed the journal for many years, the Editor already enjoys a wide circle of friends in the trade.

It was the late Sir James Ball, when Government Timber Controller during the War, who remarked to a deputation that "he found the *TIMBER TRADES JOURNAL* was the timber merchant's bible."

Bouverie House.

By 1924 it had become clear to Sir Ernest Benn that new premises were required if the development of his various businesses was to continue. The advantages of a situation in the Fleet Street area had been proved beyond question during the previous seven years. A careful survey of existing premises led to the conclusion that adequate accommodation could only be secured by erecting a new building. Accordingly Nos. 154-160, Fleet Street were purchased and the several offices and shops demolished to provide a site large enough for the purpose. The next eighteen months were a period of ceaseless activity on the part of the contractors, and there emerged the seven-storeyed building known as Bouverie House, to which Benn Brothers, Ltd., and its associated companies moved in the spring of 1926. A feature of the Portland stone façade is the balcony on which trees are planted—now generally referred to as the "Four Trees of Fleet Street"—and from the roof of Bouverie House a unique view of the Metropolis is obtained, extending for thirty miles to the south. The significance of placing trade journalism in Fleet Street has been remarked on already; the erection of a special building on the finest site in what was previously the preserve of the leading newspapers, was a gesture that finally removed trade journalism from the "side street" atmosphere in which it had been born and nurtured for seventy years.

The move to Bouverie House coincided with the entry of the third generation of Benn Brothers into the business. Mr. John Benn, who joined the staff in 1925, was elected to the Board of William Rider and Son, publishers of the

TIMBER TRADES JOURNAL and on its amalgamation with Benn Brothers became a director of the parent company. After a year's work with *THE CHEMICAL AGE*, he took over the editorship of *DISCOVERY*, and later of *The Sixpenny Library* also. Mr. Glanvill Benn entered the business in 1927, and has devoted his main attention to Ernest Benn, Ltd., of which, on Mr. Gollancz's resignation a year later, he was appointed general manager. In this connection he visited the United States and Canada in the autumn of 1929. Sir John Benn's third grandson, Mr. Keon Hughes, joined the firm in 1927 and was appointed a director of Ernest Benn, Ltd., in the following year. The family tradition in the business had already been strengthened in 1923 when Mr. A. Richard Pain, brother-in-law to Sir Ernest, resigned an important practice as solicitor to become secretary of the various companies. His legal knowledge proved invaluable in subsequent business developments and in 1927 Mr. Pain was elected to the Board of Benn Brothers.

Shortly before the firm moved into Bouverie House the General Strike of May, 1926, was declared. For the first time in the history of the publications the weekly issue had to be suspended. On the declaration of the Trade Union Council, the first move made by the Benn staff was to pass a resolution of confidence in the directors.

The steps which have always been taken to ensure the welfare of the staff have been one factor in the sense of goodwill prevailing during half a century. In 1916 a "five-day week" was instituted. The office was closed on Friday night, and for fourteen years past the office boy, in common with the managing director, has been able to enjoy the leisure of a full Saturday at home. A personal link between all those working in the company was the institution of a house magazine called *SPACE* in 1921.

For many years Benn Brothers have provided pensions for superannuated members of the firm, and the facilities for looking after the interests of the retired list are being augmented this year (1930) by the institution of a Jubilee Pension Fund. For this purpose the directors have allocated a sum of £5,000, from which various pensions and allowances will now be paid. In future years the Board hopes to make an annual allocation to this fund, subject to the approval of the shareholders.

In January, 1928, on the occasion of the Silver Wedding of Sir Ernest and Lady Benn, the staff presented Sir Ernest with his portrait, which was painted by Sir William Orpen. This choice was a particularly good one, since the artist had painted Sir John some ten years before on the private commission of his family. At a gathering in Bouverie House, which was attended by Elizabeth Lady Benn, the chairman was also presented with an album containing the congratulations and signatures of every member of the staff.

It sometimes happens that a business which has remained largely in the control of a single family for a considerable period, does not offer the same scope for those outside the family circle as is available in other organisations. Sometimes families continue to own a business without taking an active interest in the management of its affairs. Neither of these criticisms is ever heard in regard to Benn Brothers. The family takes pride in the fact that its members during three generations have worked in the business, but not less in the fact that half of the seats on the board are filled by others who have earned their positions by their own enterprise and endeavour. The latest recruits from the staff are Mr. F. E. Hamer (Editor of *THE CHEMICAL AGE*) and Miss Florence Robinson (secretary to Sir Ernest), who were elected to the Board in January, 1930. The election of Miss Robinson to the Board should finally



The Prince of Wales playing ping-pong with the boys of the John Benn Hostel, the memorial to the founder of Benn Brothers, Ltd., which His Royal Highness formally opened in 1927.



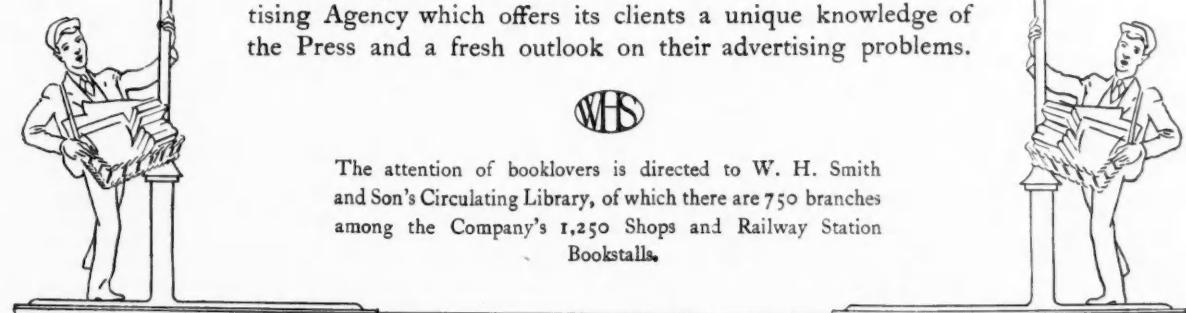
A HOUSE OF GREAT RESOURCES

In 1792, a sign over a small shop in Duke Street, London, announced that the Smith family were Newsagents and Stationers. The business to-day, with the great-great-grandson of the founder at its head, has over 1,250 branches, and world-wide activities.

It is indeed a House of great Resources. In addition to its vast Railway Bookstall and Bookshop organization for distributing Newspapers and Magazines, for selling Books and lending Books, for manufacturing and supplying Stationery and all other Writing Requisites, there is another and equally important side of the business which deals with the designing and production of the best examples of the Printing and Bookbinding arts. W. H. Smith & Son have also an Advertising Agency which offers its clients a unique knowledge of the Press and a fresh outlook on their advertising problems.



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dispel the notion still prevalent in some quarters that the same opportunities are not open to women as to men. Not only as secretary to Sir Ernest, but as the person more than anyone else responsible for the welfare of the staff, Miss Robinson fills her post with untiring efficiency. She is equally qualified as being one of the first women recipients of the Oxford M.A. degree. At the end of the War Miss Robinson conducted the propaganda of the Industrial Reconstruction Council, and was for a time on the staff of King's College for Women.

"The British Trade Journal."

The close of 1928 saw the most recent expansion in Benn Brothers' activities, when the firm acquired the interests of William Agnew, Ltd., proprietors of the **BRITISH TRADE JOURNAL**, **THE MILLER**, and the **LEATHER TRADES REVIEW**.

The **BRITISH TRADE JOURNAL** was established in 1863 by the export firm of Morgan Brothers, and the first number consisted of eighty pages. The Civil War was then raging in the United States, and one result was seen in the rising prices of cotton and wheat. Ten years later Mr. W. Agnew Pope acquired an interest in the proprietorship and the name "William Agnew" appeared as publisher. Up to this time the manufacturers and exporters of this country, although told to appeal to foreign buyers in their native language, had no trade publication to assist them in such methods. This disability was removed in 1881 when the journal issued the first number of its "Suplemento Espanola" for circulation among the business men of Spanish-speaking countries. It was immediately successful.

Encouraged by this enterprise, at the time controlled by Mr. George Evans, the management initiated further efforts of the kind, and issues were accordingly printed in the Dutch language for distribution in the Netherlands Indian Colonies, and in Italian. In 1888 Mr. W. J. Rivington acquired an interest in the business and two years later became managing proprietor on the death of Mr. Pope. Shortly afterwards a Japanese edition known as "Zasshi" was established, being translated and printed at Tokio. In the interests of this project a visit was paid by Mr. Rivington to Japan, and as the result of another journey to Russia in 1897 a Russian issue, the "Vestnik," was brought out from offices at Moscow. Ten years later a Chinese edition was published at Shanghai. With the exception of the "Suplemento Espanol," which has continued to progress and is now one of the most valuable features of the **BRITISH TRADE JOURNAL**, the foreign interests had to be abandoned on the outbreak of war. On the death of Mr. W. J. Rivington in 1914 the business passed into the hands of his son, Mr. W. G. Rivington, who for the next four years held a commission in the Coldstream Guards.

The editors are Mr. Heuner, who has given able service to the **BRITISH TRADE JOURNAL** for many years, and Mr. A. R. Edge. The manager is Mr. F. Buckingham. On the change of proprietorship in 1929 the first Portuguese edition was published.

Fifty Years' Progress.

The next of the Agnew journals, **THE MILLER**, was founded in 1875 by William Dunham, a practical miller and millstone engineer who had a thorough knowledge of the trade. The first issue appeared at the time of the great crisis when the 10,000 small mills of the country were faced with the problem of combating the importation of flour ground on the new roller system. On every hand there was a keen desire for knowledge of this new process, and of its chances of sweeping the old millstones out of existence. It was then that the founder, in response to urgent requests, decided to publish a technical journal of the craft, to spread knowledge of the new machinery and of the attempts to improve the old.

Almost from the first William Dunham had the assistance of Mr. Edward Martin, who joined the staff in 1881, and since his retirement in 1929 has remained advisory editor. "In my opinion," Mr. Martin writes of the early days, "there is not the slightest doubt that flour milling as a British industry would have, at that period, received a most crushing blow, had not the **MILLER** come into existence at the psychological moment. It is an old axiom that in most emergencies the man needed appears on the scene, and unquestionably the new journal saved the situation. It is pleasing to recognise in our columns of that period, several of the good old names who are still regular advertisers, as they have been, without a break, for a period of over fifty years."

Shortly after this crisis there arose the urgent necessity of forming a trade association and the **MILLER** once more took the lead in doing the spade work which led to the foundation of the

National Association of British and Irish Millers. The present Editor of the journal is Mr. H. G. Catchpool, and the Manager Mr. J. H. Waterfall.

The **LEATHER TRADES' REVIEW**, although the junior of Bouverie House, was founded in 1867 and is the oldest leather trade journal in the world. Like several of its associates, it was "born in the trade," its founder and first Editor having been Mr. Cleeve Hooper, a leather and tanning material merchant of Bermondsey. All its editors since have been men who have given practical service in the trade, and Mr. J. C. Harrington, the present occupier of the chair, is no exception to that tradition. It is a coincidence that the first number was published at 75, Fleet Street, a position very near to where Bouverie House now stands.

The tanning and manufacture of leather in 1867 differed greatly from the methods followed to-day. There were no large tanneries employing hundreds of men, on the other hand every small town and many a village had its little tanyard, where the hides from cattle killed in the district were dealt with, and the resultant leather was to a large extent consumed locally. One modern tannery will produce more leather in a day than some of the country tanneries of 1867 could produce in a year. From the outset the **LEATHER TRADES REVIEW** urged the application of scientific principles, long before the thought had been seized by the trade mind. It was uphill work, but thanks largely to the splendid support of the late Professor Procter—the father of leather chemistry—in the articles which appeared in the paper, success was gradually achieved, and culminated in the establishment of the Procter Research Laboratory at Leeds University. The value of the achievement is shown by the numerous research institutions in France, Australia and the United States, which have since been modelled on the Procter Laboratory.

The King's Message.

On February 1, 1930, the Jubilee banquet of Benn Brothers was held in London and attended by distinguished leaders in journalism, industry, and politics. The company was honoured by a telegram from the King, sent in reply to a loyal message from the Chairman. "The King is interested to hear that today you are commemorating the fiftieth anniversary of the foundation of your firm, and that on this auspicious occasion representatives of so many important trades are joining in the celebration. I am commanded to convey to all present the sincere thanks of His Majesty for your message of loyal greetings and to express the hope that every success may attend the efforts of your publishing house for the development of British trade."

No more gratifying tribute to the past endeavours of Benn Brothers or greater encouragement for their future could be desired. His Majesty has recognised with unerring insight the important service which trade journals render to industry, stimulating, guiding, and truthfully reflecting the activities of thousands of men and women engaged in commercial pursuits. The message sent from Sandringham shows how deep is his concern for British trade and how sincere his wishes for the continued success of an organisation whose very existence is bound up in the progress of industry. Every speaker at the Jubilee banquet reflected the unanimous sentiments of the four hundred guests of the firm, in testifying to the sincerity of purpose which has guided the policies of the house since its inception by Sir John Benn fifty years ago. It has been a record of unbroken progress and has been achieved on lines which had their origin in personal enterprise and endeavour.

One of the greatest characteristics of British commerce is its idea of permanence, its vision of continuance from generation to generation, in a word, its tradition. All that is best in British industry has this great respect for the past and this belief in continuity of purpose in the future. From the Throne downwards the support of old institutions is part and parcel of British policy, and the House of Benn to-day stands as an example of what can be achieved by two or three generations of consistent activity carried on from father to son.

Rapid as has been the rise of the trade and technical journal, no limit can be set to its prospects of expansion. Vast areas of publicity are still untapped, and an increasing demand for the co-operation of the trade journal will arise not only from old industries rejuvenated, but from new industries eager for markets. The King, in his stimulating message, looks forward to no uncertain goal—the development of British trade. The influence of the trade journal will grow in the ratio in which British trade develops, and each will be the more secure for the unqualified co-operation of the other.

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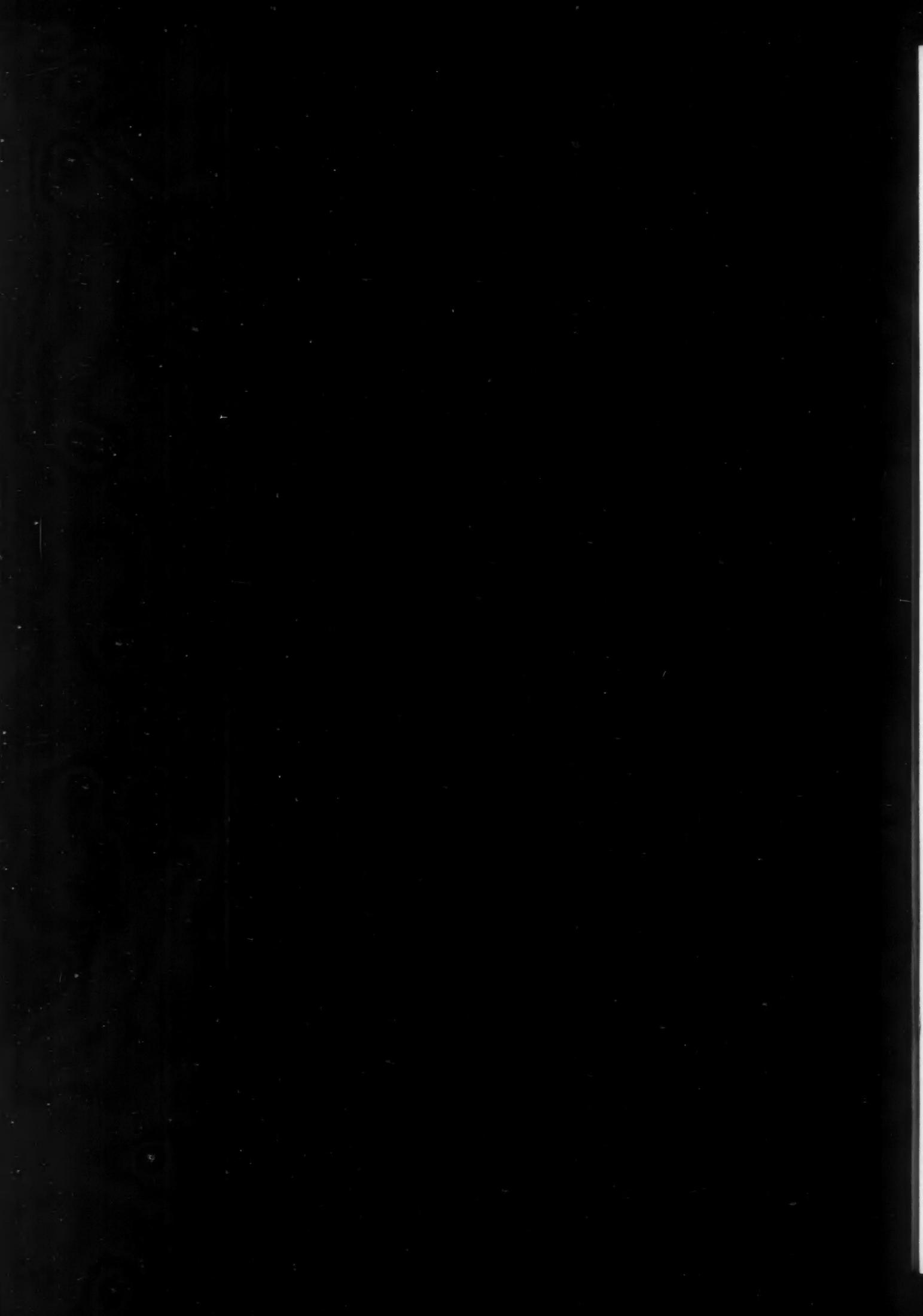
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(Continued from page 494).

- 304,798. Cracking of petroleum oils, Methods of and apparatus therefor. Standard Oil Development Co. January 27, 1928.
- 305,035. Electrodeposition of a coating of zinc. Q. Marino. January 28, 1928.
- 305,174. Monoazo dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. February 1, 1928.
- 305,489. Vat dyestuffs and intermediates of the anthraquinone series, Manufacture of. I.G. Farbenindustrie Akt.-Ges. February 3, 1928.
- 306,450. N-substituted cyano-formarylides, Preparation of. Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler. February 20, 1928.
- 305,465. Carbonisation of nickel and nickel alloys. Westinghouse Electric and Manufacturing Co. February 4, 1928.
- 308,736. Separation of liquids by distillation. Distillation Dynamique. March 27, 1928.
- 310,536. Neutral ammonium sulphate, Process and apparatus for recovering—from the mixture of crystals and liquor obtained in an ammonia sulphate saturator. C. Still. April 28, 1928.
- 311,231. Compounds of alkaline earth nitrates with methyl xanthines, Preparation of. H. P. Kaufmann. May 7, 1928.
- 316,278. Removal of ammonia and sulphuretted hydrogen from gases. C. J. Hansen. July 28, 1928. Addition to 309,116.
- 328,362. Alloys. P. D. Merica and International Nickel Co. May 16, 1929.
- 328,564. Platinum ores, concentrates or the like containing chromite. A. R. Powell, E. C. Deering and J. Matthey and Co., Ltd. January 28, 1929.
- 328,572. Acetic anhydride, Manufacture of. O. Y. Imray. (Akt.-Ges. für Stickstoffdünger.) January 29, 1929.
- 328,574. Cadmium plating. C. H. Humphries. January 29, 1929.
- 328,580. Proofing of iron and steel against rust. W. H. Cole. January 29, 1929. Addition to 289,906 and 305,386.
- 328,586. Valuable hydrocarbons and oxygen derivatives of hydrocarbons, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) November 26, 1928.
- 328,587. Motor fuels, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) December 22, 1928.
- 328,592. Purification of gases. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) January 18, 1929.
- 328,618. Low boiling hydrocarbon products, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) October 13, 1928.
- 328,620. Mixed fertilizers, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) October 29, 1928.
- 328,635. Applying heat required for chemical reactions, Method of. A. Carpmael. (I.G. Farbenindustrie Akt.-Ges.) October 24, 1928.
- 328,639. Cracking and distillation of heavy hydrocarbon oils. Midland Coal Products, Ltd., and J. E. Truzzell. December 19, 1928.
- 328,649. Hydrocarbons of low boiling point from those of higher boiling point, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) February 1, 1929.
- 328,675. Wetting, cleansing, dispersing agents and the like, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) January 31, 1929.
- 328,688. Aluminium fluoride, Manufacture of. A. Carpmael. (I.G. Farbenindustrie Akt.-Ges.) February 5, 1929.
- 328,696. Nickel and other metals from ores containing nickel, Recovery of. F. L. Duffield. February 8, 1929.
- 328,705. Vat dyestuffs containing sulphur, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) February 13, 1929.
- 328,711. Phosphoric acid and hydrogen, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) February 15, 1929.
- 328,719. Destructive hydrogenation of tars, oils, suspensions of carbonaceous material in oils and the like. W. R. Tate, H. P. Stephenson and Imperial Chemical Industries, Ltd. February 21, 1929.
- 328,738. Washing cyanide compounds, ammonia and sulphuretted hydrogen from gases, Method for. A. C. Becker and W. Bertelsmann. March 18, 1929.
- 328,743. Calcium cyanamide or products containing the same, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) March 21, 1929.
- 328,780. Sodium sulphate, Method of an apparatus for manufacturing—by the Hargreaves process. A. L. Mond. (I.G. Farbenindustrie Akt.-Ges.) April 22, 1929.
- 328,818. Chlorination of rubber. M. Deseniss and A. Nielsen. May 16, 1929.
- 328,875. Distillation of heavy liquid hydrocarbons. J. H. de Lignac. July 22, 1929.
- 328,793. Vat dyestuffs of the anthraquinone series, Manufacture of. A. Carpmael. (I.G. Farbenindustrie Akt.-Ges.) May 1, 1929.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

- Birchall, T., and Rodd, E. H. Manufacture of amidines. 15,084. May 16.
- British Cyanides Co., Ltd., and Rossiter, C. C. Manufacture of urea-formaldehyde moulding powders. 14,621. May 12.
- Brooks, R., Cockedge, H. E., and Imperial Chemical Industries, Ltd. Production of ammonium chloride and sodium bicarbonate. 15,194. May 17.
- Calco Chemical Co., Inc. Manufacture of sulphur trioxide. 14,702, 14,703. May 13. (United States, May 13, 1929.)
- Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Vulcanisation of rubber, etc. 14,754. May 13.
- Colouring rubber, etc. 14,755. May 13.
- Manufacture of zinc white. 14,872. May 14.
- Manufacture of solutions of compounds containing fluorine and aluminium. 14,992. May 15.
- Manufacture of compounds containing aluminium and fluorine. 14,993. May 15.
- Manufacture of arylsulphonic-esters of 2-8-dihydroxynaphthalene-6-sulphonic acid. 15,141. May 16.
- Manufacture of resin-like condensation products. 15,218. May 17.
- Manufacture of rubber products. 15,219. May 17.
- Coles, S. O. Cowper-. Manufacture of white lead. 14,704. May 14.
- Coley, H. E. Reduction of zinc from ores, oxides, etc. 15,080. May 16.
- Dreyfus, H. Treatment of organic compounds. 14,632. May 13.
- Treatment of carbohydrates. 14,939. May 15.
- Hamer, F. M., and Ilford, Ltd. Manufacture of dyes. 15,037. May 15.
- Holzverkohlungs Industrie Akt.-Ges. Production of acetone. 14,563. May 12. (Germany, July 13, 1929.)
- I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Manufacture of artificial masses. 14,586. May 12.
- Manufacture of hydrocarbons. 14,587. May 12.
- Manufacture of artificial resins, etc. 14,588. May 12.
- Polymerisation of diolefines. 14,832. May 14.
- Removal of acetylene from gases. 15,082. May 16.
- Removal of acetylene hydrocarbons from gases. 15,083. May 16.
- Apparatus for fusing quartz glass, etc. 15,210. May 17.
- Purification of crude hydrocarbons, etc. 15,211. May 17.
- Manufacture of resin-like condensation products. 15,218. May 17.
- I.G. Farbenindustrie Akt.-Ges. Fixing bleaching-out pictures. 14,568. May 12. (Germany, May 11, 1929.)
- Manufacture of alkylamines, etc. 14,570. May 12.
- Welding agent for magnesium. 14,582. May 12. (Germany, June 7, 1929.)
- Splinterless glass. 14,721. May 13. (Germany, May 13, 1929.)
- Manufacture of acid wool dyestuffs. 14,835. May 14.
- Manufacture of rubber products. 15,219. May 17.
- Imperial Chemical Industries, Ltd. Manufacture of phthalic anhydrides. 14,547. May 12. (United States, May 11, 1929.)
- Manufacture of arylthioglycolic acids. 14,990. May 15. (United States, May 15, 1929.)
- Manufacture of amidines. 15,084. May 16.
- Imperial Chemical Industries, Ltd., Shaw, C., and Thomas, J. Production of dyestuffs, etc. 15,085. May 16.
- Manufacture of thiazole compounds. 15,086. May 16. (United States, May 18, 1929.)
- Vulcanisation accelerators, etc. 15,214, 15,215, 15,217. May 17.
- Treatment of fish-liver oils. 15,216. May 17.
- Jackson, L. Mellersh-, and Soc. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. Manufacture of bicarbonate of soda, etc. 15,595. May 12.
- Landecker, M. Manufacture of urea-formaldehyde moulding powders. 15,140. May 16.
- Lichtenstein, L. Fixation of vat dyestuffs. 14,617. May 12.
- Mannich, C. Manufacture of aldehyde bases. 14,802. May 14.
- Naugatuck Chemical Co. Making uniformly plastic rubber, etc. 14,615. May 12. (United States, May 24, 1929.)
- Parkes, D. W., and Robinson, H. W. Apparatus for production of low boiling point hydrocarbon compounds. 14,862. May 14.
- Pfenning-Schumacher-Werke-Ges. Manufacture of urea-formaldehyde moulding-powders. 15,140. May 16.
- Soc. Anon. Holland-Belge pour la Fabrication du Coke. Obtaining sulphuretted hydrogen from aqueous solutions of alkali carbonate, etc. 14,720. May 13. (Germany, May 13, 1929.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

- ACID ACETIC**, 40% TECH.—£19 per ton.
- ACID CHROMIC**.—1s. 0d. per lb. d/d U.K.
- ACID HYDROCHLORIC**.—Spot, 3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.
- ACID NITRIC**, 80° Tw.—Spot £20 to £25 per ton, makers' works according to district and quality.
- ACID SULPHURIC**.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 6s. per ton. 168° Tw., Arsenical, 4s. 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
- AMMONIA (ANHYDROUS)**.—Spot, 11d. per lb., d/d in cylinders.
- AMMONIUM BICHROMATE**.—£4d. per lb. d/d U.K.
- BISULPHITE OF LIME**.—£7 10s. per ton, f.o.r. London, packages free.
- BLEACHING POWDER**, 35/37%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.
- BORAX, COMMERCIAL**.—Crystals, £19 10s. to £20 per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)
- CALCIUM CHLORIDE (SOLID)**, 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d in drums.
- CHROMIUM OXIDE**.—9d. and 10d. per lb. according to quantity d/d U.K.
- CHROMETAN**.—Crystals, 3d. per lb. Liquor, £18 15s. per ton d/d U.K.
- COPPER SULPHATE**.—£25 to £25 10s. per ton.
- METHYLATED SPIRIT 61 O.P.**.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.
- NICKEL SULPHATE**.—£38 per ton d/d.
- NICKEL AMMONIA SULPHATE**.—£38 per ton d/d.
- POTASH CAUSTIC**.—£30 to £33 per ton.
- POTASSIUM BICHROMATE CRYSTALS AND GRANULAR**.—4d. per lb. nett d/d U.K. spot; ground 4d. per lb. extra.
- POTASSIUM CHLORATE**.—3d. per lb., ex-wharf, London, in cwt. kegs.
- POTASSIUM CHROMATE**.—8d. per lb. d/d U.K.
- SALAMMONIAC**.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.
- SALT CAKE, UNGROUND**.—Spot, £3 7s. 6d. per ton d/d station in bulk.
- SODA ASH**, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.
- SODA CAUSTIC, SOLID**, 76/77° E.—Spot, £14 10s. per ton, d/d station.
- SODA CRYSTALS**.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2 cwt. bags.
- SODIUM ACETATE 97/98%**.—£21 per ton.
- SODIUM BICARBONATE, REFINED**.—Spot, £10 10s. per ton d/d station in bags.
- SODIUM BICHROMATE CRYSTALS**.—3d. per lb. nett d/d U.K. spot. Anhydrous 4d. per lb. extra.
- SODIUM BISULPHITE POWDER**, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.
- SODIUM CHLORATE**.—2d. per lb.
- SODIUM CHROMATE**.—3d. per lb. d/d U.K.
- SODIUM NITRITE**.—Spot, £19 per ton, d/d station in drums.
- SODIUM PHOSPHATE**.—£14 per ton, f.o.b. London, casks free.
- SODIUM SILICATE**, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.
- SODIUM SULPHATE (GLAUBER SALTS)**.—Spot, £4 2s. 6d. per ton, d/d address in bags.
- SODIUM SULPHIDE SOLID**, 60/62%.—Spot, £10 5s. per ton d/d in drums. Crystals—Spot, £7 10s. per ton d/d station in sellers' casks.
- SODIUM SULPHITE, PEA CRYSTALS**.—Spot, £13 10s. per ton, d/d station in kegs Commercial—Spot, £9 per ton, d/d station in returnable casks.

Coal Tar Products

- ACID CARBOLIC CRYSTALS**.—7d. to 7d. per lb. Crude 60's, 2s. 5d. April-June, 2s. 4d. July-Dec. per gall.
- ACID CRESYLIC** 99/100.—2s. 2d. to 2s. 6d. per gall. Pure, 5s. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 2s. to 2s. 2d. Dark, 1s. 6d. to 1s. 9d. Refined, 2s. 7d. to 2s. 10d. per gall.
- ANTHRACENE**.—A quality, 2d. to 2d. per unit. 40%, £4 10s. per ton.
- ANTHRAZENE OIL, STRAINED**, 1080/1090.—4d. to 5d. per gall. 1100, 5d. to 6d. per gall.; 1110, 6d. to 6d. per gall. Unstrained (Prices only nominal).
- BENZOLE**.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.
- TOLUOLE**.—90%, 1s. 9d. to 1s. 11d. per gall. Firm. Pure, 1s. 11d. to 2s. 3d. per gall.
- XYLOL**.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6d. to 7d. per gall.; Heavy, for Export, 6d. to 6d. per gall. Home, 4d. per gall. d/d. Middle oil, 4d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 1d. to 1d. per gall. ex works. Salty, 7d. per gall.

NAPHTHA.—Crude, 8d. to 8d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 6d. per gall. Solvent 90/190, 1s. to 1s. 2d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £4 10s. per ton. Hot pressed, £8 per ton.

NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Flaked, £14 to £15 per ton, according to districts

PITCH.—Medium soft, 46s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—Is. 8d. per lb.

ACID GAMMA.—Spot, 3s. 9d. per lb. 100% d/d buyer's works.

ACID H..—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—Is. 5d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHROP.—Spot, 2s. 7d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works.

BENZALDEHYDE.—Spot, is. 8d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

BENZOIC ACID.—Spot, is. 8d. per lb. d/d buyer's works.

o-CRESOL 30/31° C.—£3 1s. 10d. per cwt., in 1 ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots d/d.

p-CRESOL 32/34° C.—2s. per lb., in ton lots d/d.

DICHLORANILINE.—Is. 10d. per lb.

DIMETHYLANILINE.—Spot, is. 9d. per lb., drums extra d/d buyer's works.

DINITROBENZENE.—8d. per lb.

DINITROCHLOROBENZENE.—£74 per ton d/d.

DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 9d. per lb.

DIPHENYLAMINE.—Spot, is. 8d. per lb. d/d buyer's works.

a-NAPHTHOL.—Spot, is. 11d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, is. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, is. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6d. per lb., 5-cwt. lots, drums extra, d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.

R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.

SODIUM NAPHTHIONATE.—Spot, is. 6d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, is. 9d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 1d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—Is. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

WOOD CREOSOTE.—Is. 9d. per gall., unrefined.

WOOD NAPHTHA, MISCELL.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—Is. 8d. to 1s. 10d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity.

CARBON BLACK.—4d. to 4d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—3s. 6d. per lb.

LITHOPONE, 30%.—£20 to £22 per ton.

SULPHUR.—£9 10s. to £13 per ton, according to quality

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£55 to £60 per ton.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton, ex wharf London, barrels free.

ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity

ACID, BENZOIC B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £32 per ton; powder, £36 per ton; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 6½d. to 1s. 7½d. per lb., less 5%.

ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—5s. 3d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 2½d. per lb., less 5%.

ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.

AMIDOL.—7s. 6d. to 9s. per lb., d/d.

AMIDOPYRIN.—7s. 9d. to 8s. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.

ATROPHINE SULPHATE.—9s. per oz.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.

BISMUTH CARBONATE.—7s. 6d. per lb.

BISMUTH CITRATE.—7s. 6d. per lb.

BISMUTH SALICYLATE.—7s. 3d. per lb.

BISMUTH SUBNITRATE.—6s. 6d. per lb.

BISMUTH NITRATE.—Cryst. 5s. per lb.

BISMUTH OXIDE.—9s. 6d. per lb.

BISMUTH SUBCHLORIDE.—9s. 9d. per lb.

BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.

BISMUTH ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 11½d. per lb.; 12 W. Qts. 10d. per lb.; 36 W. Qts. 9d. per lb.

BORAX B.P.—Crystal, £21 per ton; powder, £22 per ton; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 5½d. per lb.; granular, 1s. 4½d. to 1s. 5½d. per lb.; sodium, 1s. 8d. per lb. Prices for 1 cwt. lots.

CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., in 1-cwt. lots.

CAMPHOR.—Refined flowers, 3s. 3d. to 3s. 4d. per lb., according to quantity; also special contract prices.

CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.

CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

ETHERS.—S.G. .730—11d. to 1s. per lb., according to quantity; other gravities at proportionate prices.

FORMALDEHYDE '40%.—37s. per cwt., in barrels, ex wharf.

GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.

HEXAMINE.—2s. 3d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—3os. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 12os. per oz.

HYDROGEN PEROXIDE (12 VOL'S).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vol's, 2s. to 2s. 3d. per gall.; 20 vol's., 4s. per gall.

HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.

IRON AMMONIUM CITRATE.—B.P., 2s. 5d. per lb. for 28 lb. lots. Green, 3s. 1d. per lb. U.S.P., 2s. 4d. to 2s. 7d. per lb.

IRON PERCHLORIDE.—1s. to 2os. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8½d. to 8½d. per oz., according to quantity.

MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower;

Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 17s. per lb. net; Synthetic, 9s. 6d. to 11s. 9d. per lb.; Synthetic detached crystals, 9s. 6d. to 11s. per lb., according to quantity; Liquid (95%), 9s. per lb.

MERCURIALS B.P.—Up to 1 cwt. lots. Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. od. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb.

METHYL SULPHONATE.—18s. 6d. to 20s. per lb.

METOL.—9s. to 11s. 6d. per lb. British make.

PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb.

PHENACETIN.—3s. 9d. to 4s. 1d. per lb.

PHENAZONE.—5s. 11d. to 6s. 14d. per lb.

PHENOLPHTHALEIN.—5s. 6d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—96s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P.C., 2s. 3d. per lb. in 28 lb. lots. Smaller quantities 1d. per lb. more.

POTASSIUM FERRICYANIDE.—1s. 7d. per lb., in 125 lb. kegs

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins

RESORCIN.—2s. 10d. to 3s. per lb., spot.

SACCHARIN.—43s. 6d. per lb.

SALOL.—2s. to 2s. 6d. per lb.

SODIUM BENZOATE B.P.—1s. 9d. per lb. for 1-cwt. lots.

SODIUM CITRATE, B.P.C., 1911, AND U.S.P. VIII.—1s. 11d. per lb., B.P.C. 1923, and U.S.P. IX—2s. 3d. per lb. Prices for 28 lb. lots. Smaller quantities 1d. per lb. more.

SODIUM FERROCYANIDE.—4d. per lb., carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. Crystals, 5s. per cwt. extra.

SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.

SODIUM SULPHIDE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.

SULPHONAL.—9s. 6d. to 10s. per lb.

TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.

THYMOL.—Puriss, 8s. 3½d. to 9s. 2d. per lb., according to quantity.

Firmer. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—12s. per lb.

AMYL ACETATE.—2s. 6d. per lb.

AMYL BUTYRATE.—5s. per lb.

AMYL CINNAMIC ALDEHYDE.—12s. per lb.

AMYL SALICYLATE.—3s. per lb.

ANETHOL (M.P. 21/22° C.).—6s. 6d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.

BENZYL BENZOATE.—2s. 6d. per lb.

CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.

COUMARIN.—12s. per lb.

CITRONELLOL.—10s. per lb.

CITRAL.—8s. per lb.

ETHYL CINNAMATE.—6s. 6d. per lb.

ETHYL PHTHALATE.—2s. 9d. per lb.

EUGENOL.—9s. 6d. per lb.

GERANIOL (PALMAROSA).—20s. per lb.

GERANIOL.—7s. 6d. to 10s. per lb.

HELiotropine.—6s. 6d. per lb.

Iso EUGENOL.—11s. 9d. per lb.

PHENYL ETHYL ACETATE.—11s. per lb.

PHENYL ETHYL ALCOHOL.—9s. per lb.

RHODINOL.—46s. per lb.

SAFROL.—2s. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN, EX CLOVE OIL.—13s. 6d. to 15s. per lb. Ex Guaiacol, 12s. 6d. to 13s. 9d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.

ANISE OIL.—4s. 3d. per lb.

BERGAMOT OIL.—10s. 9d. per lb.

BOURBON GERANIUM OIL.—20s. per lb.

CAMPHOR OIL, WHITE.—160s. per lb.

CANANGA.—Java, 9s. 6d. per lb.

CASSIA OIL, 80/85%.—4s. 9d. per lb.

CINNAMON OIL LEAF.—7s. 9d. per oz.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R. W. Greff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, May 22, 1930.

THERE has been a little improvement in business during the current week although it is still on the quiet side. Export business has been fair.

General Chemicals

ACETONE.—Firm at £71 10s. to £80 per ton, according to quantity, and in steady request.

ACID ACETIC.—The good demand continues with price firm at £36 10s. for 80% technical; and £37 10s. per ton for 80% edible.

ACID CITRIC.—Still weaker at about 1s. 7d. to 1s. 7½d. per lb., less 5%.

ACID LACTIC.—In steady demand and firm at £42 per ton, for 50% by weight, pale quality.

ACID OXALIC.—The improved demand continues with price firm at £30 7s. 6d. per ton to £32 per ton, according to quantity.

ALUMINA SULPHATE.—Continues firm at £8 to £8 15s. per ton, for the 17-18% iron free quality.

ARSENIC.—Unchanged at about £15 15s. per ton, free on rails at mines.

CREAM OF TARTAR.—A little easier at about 95s. per cwt., ex wharf London.

COPPER SULPHATE.—There is quite a good enquiry with price unchanged at £21 10s. to £22 per ton, free on rails London.

FORMALDEHYDE.—In steady request at about £33 10s. per ton.

LEAD ACETATE.—Continues steady at £40 5s. per ton for white; and £39 5s. per ton for brown.

LEAD NITRATE.—In a little better demand at £33 per ton.

LITHOPONE.—£19 15s. to £25 per ton, according to grade and quantity and in steady demand.

CARBONATE OF POTASH.—96/98% free from arsenic, continues firm at £27 per ton.

PERMANGANATE OF POTASH.—Steady at 5½d. per lb. for the B.P. quality, with an improved demand.

SODA BICHROMATE.—In steady request at 3½d. per lb., with a firm position.

SODIUM HYPO SULPHITE.—Photographic crystals, firm and in steady request at £14 15s. per ton; commercial, £8 10s. to £9 per ton.

SODIUM SULPHIDE.—Unchanged at British makers' prices.

TARTAR Emetic.—Quiet at about 11d. per lb.

ZINC SULPHATE.—Unchanged at about £13 per ton.

Coal Tar Products

Prices of coal tar products show no change from last week, and the market still remains inactive.

MOTOR BENZOL.—Unchanged at about 1s. 5½d. to 1s. 6½d. per gallon, f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 2½d. to 1s. 3d. per gallon, f.o.r.

HEAVY NAPHTHA.—Quoted at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL.—Remains at 3d. to 3½d. per gallon, f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Quoted at 2s. per gallon for the 98/100% quality, and at 1s. 10d. per gallon, ex works, for the dark quality 95/97%.

NAPHTHALENES.—The firelighter quality is quoted at £3 10s. to £3 15s. per ton, the 74/76 quality at £4 to £4 5s. per ton, and the 76/78 quality at about £5 per ton.

PITCH.—The nominal price remains at 45s. to 47s. 6d. per ton, f.o.b. East Coast port, but business for this season is practically at an end.

We have received the following additional prices:

Carbolic Acid is unchanged at 7d. to 7½d. per lb.

Cresylic Acid is steady. Pale, 98%, 2s. to 2s. 2d. Refined, 2s. 7d. to 2s. 10d. per gallon.

Sodium Salicylate B.P.—1s. 11d. to 2s. 3d. per lb. for crystals.

1s. 10d. to 2s. 2d. for powder.

Salicylic Acid B.P.—1s. 5d. to 1s. 8d. per lb., according to quantity.

for coke-oven and gasworks tar being unchanged. Heavy naphtha remains weak at from 11d. to 1s. 1d. per gallon, but solvent is in fair request at from 1s. 3d. to 1s. 5d. per gallon. Motor benzol is steady at from 1s. 4d. to 1s. 6d. per gallon. Sulphate of ammonia has practically no call. Patent fuel and coke exports continue to be on a moderate scale. Patent fuel prices for export are:—22s., ex-ship Cardiff; 21s., ex-ship Newport, and from 20s. to 21s., ex-ship Swansea. Coke prices for export are:—36s. to 37s. best foundry; 30s. to 32s. 6d. good foundry, and from 25s. to 27s. 6d. for furnace.

Scottish Coal Tar Products

CREOSOTE oil is benefiting by the increased demand for refined tar, and values are becoming steadier. Motor benzole is still a goop market, but other products are dull with prices easy.

Cresylic Acid is still attracting little or no attention and prices are easy. Pale 99/100%, 1s. 10d. to 1s. 11½d. per gallon; pale 97/99%, 1s. 9d. to 1s. 10d. per gallon; dark 97/99%, 1s. 8½d. to 1s. 9½d. per gallon; high boiling, 1s. 9d. to 1s. 11d. per gallon; all ex-makers' works in buyers' packages.

Carbolic Sixties.—The production is small and value is steady at 2s. 4d. to 2s. 6d. per gallon for ordinary quality.

Creosote Oil.—The market is in a healthier condition owing to the increased demand for road-tar. Specification oil, 3d. to 3½d. per gallon; gas works ordinary, 3d. to 3½d. per gallon; washed oil, 3½d. to 3½d. per gallon; all f.o.r. works.

Coal Tar Pitch.—The value is purely nominal at about 47s. 6d. per ton f.a.s. Glasgow for export. Home quotations are about 50s. to 52s. 6d. per ton, f.o.r. works.

Blast Furnace Pitch is unchanged at 30s. per ton f.o.r. works for home trade and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—The output is increasing and it is anticipated that distillers will shortly be working to capacity. Value is steady at 3½d. to 4d. per gallon, f.o.r. works, in buyers' barrels.

Blast Furnace Tar.—The price remains at 2½d. per gallon.

Crude Naphtha is quiet with quotations easy at about 4d. to 4½d. per gallon.

Water White Products.—While 90/160 and 90/190 grades of naphtha remain easy at 1s. 2d. to 1s. 3d. per gallon and 1s. to 1s. 1d. per gallon respectively, motor benzole continues firm at 1s. 6½d. to 1s. 6½d. per gallon.

South Wales By-Products

THERE is very little change in South Wales by-product activities. The market for most products remains unsatisfactory. Pitch is inactive save for a small forward inquiry, and prices are nominal round about the 47s. per ton mark. Road tar has a more steady demand and quotations have advanced from 12s. to 14s. to 14s. to 15s. per 40-gallon barrel. Creosote is slow at from 2½d. to 3½d. per gallon. Refined tars have a moderate, but steady, call, values

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.

Glasgow, May 21, 1930.

BUSINESS in the heavy chemical market has remained fairly steady, both as regards inquiries and orders placed. There are not many orders for forward delivery, however, buyers merely covering their regular requirements. Prices are practically unchanged.

Industrial Chemicals

ACETONE, B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID, ACETIC.—This material is still scarce for immediate supply but prices remain unchanged as follows: 98/100% Glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports. 80% pure, £37 10s. per ton, ex wharf. 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags, carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at the same price, viz.: 3½d. per lb., ex store. Offered from the Continent at 3½d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC B.P. CRYSTALS.—Quoted 1s. 4d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. 4½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £7 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f., U.K. ports. Crystal Meal about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 88°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATIC.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f., U.K. ports.

ANTIMONY OXIDE.—Rather easier and spot material now obtainable at round about £34 per ton, ex wharf. On offer for prompt shipment from China at about £30 per ton, c.i.f., U.K. ports.

ARSENIC, WHITE POWDERED.—Quoted £18 per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f., U.K. ports. For Continental material our price would be £16 per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacture contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price £4 15s. per ton to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE 40%.—Now quoted £35 per ton, ex store. Continental material now on offer at about £34 per ton, ex wharf.

GLAUBER SALTS.—English material, quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Price now £37 10s. per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD, ACETATE.—White crystals quoted round about £39 to £40 per ton, ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 4d. per gallon, less 2% delivered.

POTASSIUM BICHROMATE.—Quoted 4½d. per lb. delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer at £26 10s. per ton, ex store. Offered from the Continent at £25 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE.—99½/100% Powder. Quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5½d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted at 7d. per lb., ex store. Offered for prompt delivery from the continent at about 6½d. per lb., ex wharf.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station, M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3½d. per lb., delivered buyer's premises with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, 27s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay minimum four-ton lots with various reductions for contracts.

SODIUM CAUSTIC.—Powdered, 98/99%, £17 10s. per ton in drums; £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums; £14 12s. 6d. per ton for 70/72% in drums, all carriage paid buyers' stations, minimum four-ton lots. For contracts 10s. per ton less.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum four-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers are now offering at £10 2s. per ton, carriage paid buyers' sidings, minimum five-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5½d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices 55s. per ton, ex works, 57s. 6d. per ton delivered for unground quality. Ground quality, 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid, 61/62%, £9 15s.; broken, 60/62%, £10 15s. per ton; crystals, 30/32%, £7 17s. 6d. per ton, all delivered buyers' works on contract minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 5s. per ton, ex store.

ZINC.—Chloride 98%.—British material offered at round about £20 per ton f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £10 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Chlorine Production in Russia

Use of American Patents and Engineers

THE Amtorg Trading Corporation has announced the conclusion of a contract between the United Chemical Industries of the U.S.S.R. and the Westvaco Chlorine Products, Inc., of West Virginia, U.S.A., providing for technical assistance in the production of liquid chlorine in the Soviet Union and the manufacture of Vorce chlorine cells for salt brine electrolysis.

Mr. P. A. Bogdanov, chairman of the board of the Amtorg Trading Corporation, in announcing the signing of the new agreement, stated: "The rapid industrial development of the Soviet Union and the reorganisation of agriculture necessitate the building up of a chemical industry practically from the bottom. This is particularly true of the production of chemical fertilisers, the consumption of which before the war was negligible, and which is now being nearly doubled every year. The steady growth of the textile industry, in consequence of the increased demand, particularly on the part of the village population, has brought about the necessity of establishing chlorine industries to produce the chemicals needed for bleaching of cloth."

The contract signed with the Westvaco Company provides for the use of the patents of the American company by the Soviet chemical industry and for the sending there of American engineers. In addition, Soviet engineers will study production methods at the Westvaco plants. The first chlorine plant of the several to be constructed in the U.S.S.R. is to be completed in about six months.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, May 22, 1930.

CONDITIONS in the chemical market here during the past week have been extremely patchy, and it is almost strictly correct to say that no two reports of traders are alike. There is a fair flow of the bread-and-butter lines of chemicals, mainly against existing contract commitments, and in one or two of the special lines of bulk products a moderate volume of business has been booked, some of it forward over the next two or three months. For the most part, however, only a relatively quiet business is going through, and indications of slight weakness are discernible in one or two sections of the market.

Heavy Chemicals

A fair volume of trade is passing in the case of bicarbonate of soda, offers of which are well held on a contract basis of £10 10s. per ton. Bichromate of soda meets with a quietly steady demand, and here also prices are firm on the basis of 3½d. per lb. There is not a great deal of business reported in respect of saltcake, current values of which are at from £2 15s. to £3 per ton. Caustic soda is moving in moderate quantities, principally against old contracts, which are quoted at from £12 15s. to £14 per ton, according to grade. Sulphide of sodium is in quiet request only, but there has been little quotable change in the price position of this material, the commercial product offering at round £8 per ton, and the 60 to 65 per cent. concentrated solid quality at from £9 10s. to £10. Alkali is firm at round £6 per ton, and a moderate amount of buying interest is being displayed. Chlorate of soda continues to show signs of easiness, and values to-day are at from about £24 10s. to £25 per ton, with sales of limited extent. There is some inquiry about for dibasic phosphate of soda, values of which keep reasonably steady at round £11 10s. per ton. With regard to hyposulphite of soda, a quiet business is going through in this material, and values keep steady at up to £15 10s. per ton for the photographic quality and round £9 for the commercial.

There is a moderate inquiry about for yellow prussiate of potash, and prices keep up very well at from 6½d. to 7½d. per lb., according to quantity. The demand for carbonate of potash is only on quiet lines, and at a top price of about £26 per ton quotations in this section are not too strong. Chlorate of potash is on the slow side, and at about £26 per ton the tendency is easy. Bichromate of potash is steady at 4½d. per lb., less discounts of 1 to 2½ per cent., and a fair amount of business is being put through. There is not a great deal being done in the case of permanganate of potash, but offers of this material keep up at round 5½d. per lb. for the B.P. grade and 5½d. for the commercial. Caustic potash is about maintained at £31 per ton, though the demand is rather subdued.

Although perhaps not quotably changed arsenic at from £15 10s. to £15 15s. per ton, on rails, for white powdered, Cornish makes, is not too strong at the moment, and business is only moderate. A quiet trade is being done in sulphate of copper, offers of which are at round £25 per ton, f.o.b. The lead products are weaker at about £37 and £36 per ton for white and brown acetate and nitrate at round £31. The acetates of lime are quotably unchanged on the week at about £7 10s. per ton for the brown material and £15 for the grey, and moderate sales are reported.

Acids and Tar Products

Citric acid meets with a quiet demand, and offers are fairly steady at the moment at 1s. 8½d. per lb. Tartaric is maintained at round 1s. 3d. per lb., with sales on very moderate lines. Acetic acid is moving in fair quantities, and prices keep firm at about £66 per ton for the glacial material and £36 10s. for the commercial 80 per cent. quality. Oxalic acid is unchanged on the week at £1 12s. per cwt., ex store.

Among the by-products, pitch is inactive though nominally steady at about 47s. 6d. per ton, f.o.b. Creosote oil is weak in tendency at from 3½d. to 4½d. per gallon, naked, and the demand is slow. Crude carbolic is in moderate request at 2s. 5d. per gallon, at works, with crystals slow but unchanged at about 7½d. per lb., f.o.b. Offers of solvent naphtha are at down to about 1s. 2d. per gallon naked, with the demand restricted.

Company News

CHLORIDE ELECTRICAL STORAGE CO.—The directors announce a final dividend of 20 per cent. on the ordinary shares, free of tax, making 30 per cent., free of tax, for the year ended March 31, 1930, against 25 per cent. for the previous twelve months.

NITRATE PRODUCERS' STEAMSHIP CO.—For the year ended April 30, 1930, the profits amounted to £96,322, and the amount divisible is £111,807, as against £90,915, and £105,872 respectively last year. It is proposed to place £60,000 to depreciation reserve, as compared with £55,000 a year ago, and to pay a final dividend of 3½ per cent. and bonus of 2½ per cent., both free of income tax, making 10 per cent., free of income tax, for the year, the same as last year, carrying forward £15,472, compared with £15,485 brought in.

UNITED PREMIER OIL AND CAKE CO.—The report for 1929 states that the profits amounted to £55,185 as compared with £67,645 for the preceding year. Investments in and advances to subsidiary companies remain in accounts at cost, viz., £1,540,346. Yield from these investments for past year is about 3½ per cent. The balance, as shown by revenue account, amounts to £55,185, which, after deducting interest on debenture stock, and provision in respect of trading losses of subsidiary companies, and adding amount brought forward, gives a surplus of £60,926. Of this amount, dividend on preference shares to December 31, 1929, takes £34,431, leaving a balance of £26,495, to be carried forward. No dividend has been paid on ordinary shares since 1924.

B. LAPORTE, LTD.—The report of the directors to be submitted to the general meeting of the shareholders at the Luton Chamber of Commerce Room on Thursday next, states that the profit and loss account for the year, after charging directors' fees and making adequate provision for depreciation and doubtful debts, shows a balance of profit amounting to £33,417, to which is added the balance of profit and loss account brought forward from last account, £9,519; making a total of £42,936. From this is deducted dividends on preference shares (already paid) for the year, £10,447, and balance of taxes account, £1,591, leaving a balance of £30,897 17s. 2d. which it is proposed to allocate as follows:—Dividend on the ordinary shares at the rate of 9 per cent. for the year ended March 31, 1930 (payable less income tax), £9,720; to transfer to reserve fund, £1,445; to transfer to investments reserve account, £2,500; to write off patents account, £500; to transfer to income tax suspense account, £6,000; to carry forward to next account, £10,733.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CANADA.—The representation of British makers of lithopone, blanc fixe, zinc oxide and factice (rubber substitute) is required by a manufacturers' agent in Toronto. Ref. No. 400.

ARGENTINA.—A firm in Rafaela, Province of Santa Fé, is desirous of getting into touch with British manufacturers of disinfectants, insecticides and bitumens. Ref. No. 422.

BRITISH INDIA.—A firm of importers, who also do an indent and commission business in Bombay, is desirous of obtaining a British agency for industrial chemicals. Ref. No. 396.

EGYPT.—The Ports and Lighthouses Administration, Alexandria, is calling for tenders, to be presented in Alexandria by June 5, for the supply of pitch, tar, oakum, paints, oil, etc. Ref. No. B.X. 6,430.

The Egyptian Ministry of Agriculture is calling for tenders, to be presented in Cairo by June 7, for the supply of the following chemical manures: 48,000 tons ordinary nitrate of soda; 48,000 tons granulated nitrate of soda; 12,000 tons nitrate of lime; 7,000 tons superphosphate of lime. Ref. No. B.X. 6,422.

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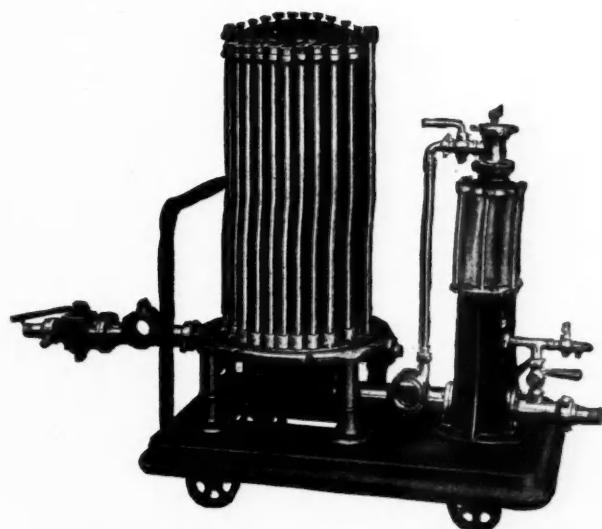
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Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

STAMINA, LTD., 39, Victoria Street, S.W., chemical products manufacturers. (C.C., 24/5/30.) £19 3s. 1d. March 12.

PHILLI-MERRANO CO., 106, Union Street, Southwark, manufacturing chemists. (C.C., 24/5/30.) £18 6s. 1d. April 10.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]

APEX (BRITISH) ARTIFICIAL SILK, LTD., London, E. (M., 24/5/30.) Registered May 5. £12,000 debentures, to E. J. Boake, Widford Lodge, Chelmsford, and another; general charge. *Nil. December 30, 1929.

GEE (BEAUMONT) AND CO., LTD., Greetland, dyers and finishers. (M., 24/5/30.) Registered May 7. £1,000 second debenture and a collateral charge to J. W. Darwent, Briardene Avenue, Burniston Road, Scarborough; general charge, and charged on Sunnyside Dyeworks, Greetland. *£1,500. March 29, 1930.

London Gazette, &c.

Companies Winding Up Voluntarily

WALDIE (D.) AND CO. (LONDON), LTD. (C.W.U.V. 24/5/30.) By special resolution, May 14. Major P. H. Cruickshank appointed as liquidator. The above is a members' voluntary winding-up, and all creditors will be paid in full.

MIDLAND MEAL OIL AND COLOUR CO., LTD. (C.W.U.V., 24/5/30.) By special resolution, May 14. C. Ellett Bream, 1, Wycliffe Street, Leicester, chartered accountant, appointed as liquidator.

Bankruptcy Information

SELLERS, Thomas Ernest, Field Head, Quarmby, Huddersfield, Yorks., aniline dyer. (R.O., 24/5/30.) Receiving order, May 16. Creditor's petition.

New Companies Registered

INDURITE SALES, LTD., Byron House, St. James's Street London, S.W.1—Registered May 16. Nominal capital £1,500 in £1 shares. Selling agents and factors of a composition known as Indurite and of all articles manufactured therefrom; merchants, importers and exporters of chemicals and chemical products, etc. Directors: L. E. Gaunt and I. Parker.

THE IRISH NATIONAL DEVELOPMENT CO., LTD., 7-8, Norfolk Street, Strand, London, W.C.2.—Registered as a "private" company on May 15. Nominal capital, £10,000 in 5,000 10 per cent. participating preference shares of £1 each and 100,000 ordinary shares of 1s. each. The objects are to carry on the business of colliery proprietors, ironmasters, coke manufacturers and merchants, miners, smelters, engineers, manufacturers of chemicals and manures, distillers, dye makers, gas makers, metallurgists, etc. A subscriber: A. J. Bennell, "Shirley," Cecilia Grove, St. Peters, Broadstairs.

M. I. AISCHE AND CO., LTD.—Registered May 16. Nominal capital, £25,000 in 20,000 ordinary shares of £1 each and 100,000 deferred shares of 1s. each. To acquire a lease of certain hereditaments and premises known as "Sapphir Chemical Works" at Whieldon Road, Fenton, Stoke-on-Trent, and the business of a chemical and colour manufacturer and manufacturer of Plaster of Paris and Keen's Cement now carried on by M. I. Aische, and to carry on the business of manufacturers of and dealers in general, heavy and pharmaceutical chemicals, colloidal chemicals, dry, mineral and colloidal colours, etc. Directors: M. I. Aische (chairman), Sapphire Chemical Works, Stoke-on-Trent; R. E. Wood, A. Wood, G. Goodwin, W. B. Sutton, W. J. Kent, G. H. Woodwin.

New Benn Publications

THE new publications announced by Ernest Benn, Ltd., include the following:—

The Life and Letters of Joseph Pennell. By Mrs. Elizabeth Robins Pennell. 2 volumes, illustrated, 42s. the set. The essential integrity and faithfulness to his vision of art, of the greatest etcher of modern times, is clearly brought out in this memoir of a full life.

Some of the English. By Oliver Madox Hueffer. 10s. 6d. Having studied French France, Mr. Hueffer now turns his searchlight on to his own countrymen, with most entertaining and provocative results.

Without Cherry Blossom. By Panteleimon Romanoff, translated by L. Zarine, edited and with an introduction by Stephen Graham. 7s. 6d. Russia has abolished the sacrament of marriage. Here are some of the results in fiction form.

Franz Greenwood: Dutch Glass Engravers, Vol. I, by Wilfred Buckley. 36 plates, 25s. The first of a series of monographs on the group of Dutch artists whose skilful work is much sought after by specialists.

Benn's Essex Library.—*Lovers and Friends.* By E. F. Benson. 3s. 6d. *The Coming of the Friars.* By Augustus Jessopp, D.D. 3s. 6d.

Reprints.—*A Literary History of Rome in the Silver Age.* By J. Wight Duff. 21s. Second impression. *Harding's Luck.* By E. Nesbit. 3s. 6d. Third impression. *History of England.* By David Somervell. 6d. Reprint. *Modern Scientific Ideas.* By Sir Oliver Lodge. 6d. Reprint. *The Select Plays of Sir John Vanbrugh,* edited, with an introduction and notes, by A. E. H. Swain. 3s. 6d., cloth 5s., leather 7s. 6d. Reprint.

Tariff Changes

ITALY.—Revised valuations for essential oils, synthetic perfumes, alkaloids and alkaloid salts in the Italian Customs Tariff have been prescribed by a decree dated March 7. In a number of cases, the new valuations are lower than those previously in force, some items are omitted from the new list, and in a few cases the valuation has been raised.

NYASALAND.—A proclamation prohibits the import into the Protectorate of trade spirits of every kind and beverages mixed with these spirits; and distilled beverages containing thujone, star anise, benzoic, aldehyde, salicylic esters, hyssop, absinthe or any essential oils or chemical products which are recognised as injurious to health.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries:—

143. (*Calcium Cyanamide*).—A subscriber requires supplies of Calcium Cyanamide, technical quality.

144. (*Acetaldehyde*).—A London firm is anxious to obtain details of a process for the manufacture of Acetaldehyde from Alcohol by the Catalytic Method, and then the further transformation of the Acetaldehyde into Ethyl Acetate. They understand that there is a process for obtaining Ethyl Acetate from Acetaldehyde by means of Aluminium Ethoxide. The firm contemplate purchasing a plant (which is required for use in the Colonies) capable of producing 50,000 gallons of Ethyl Acetate per annum.

